

# California Environmental Protection Agency's Children's Environmental Health Program



**A Report on Implementation of the  
Governor's Children's Environmental Health Initiative,  
The Requirements of Chapter 731, Statutes of 1999, and  
The Requirements of Chapter 144, Statutes of 2000**



**Submitted by the  
Children's Environmental Health Center**

**January 2002**



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The California Environmental Protection Agency's  
Children's Environmental Health Program

Biennial Report 2000 - 2001

A Report to the Governor and Legislature on Implementation of the  
Governor's Children's Environmental Health Initiative,  
The Requirements of Chapter 731, Statutes of 1999, and  
The Requirements of Chapter 144, Statutes of 2000

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## Table of Contents

	Page
Executive Summary	1
I. Implementation of Ch. 731, Statutes of 1999 (SB 25)	
A. Review of California Ambient Air Quality Standards	
1. Review of California's Health-based Standards	17
2. Revision of Particulate Material and Sulfate Standards	23
B. Evaluating the Adequacy of California's Air Quality Monitoring Network	
1. Community Air Monitoring Studies: Outdoors	25
2. Community Air Monitoring Studies: Indoors	36
C. Review of Toxic Air Contaminants (TACs)	
1. List of TACs of Concern for Children	38
2. Air Toxics Control Measures	42
II. Governor's Children's Environmental Health Initiative	
A. Cancer Risk Assessment for Children	47

B. Contaminants of Greatest Potential Health Concern at Schools	50
C. Children's Environmental Exposure Studies	
1. Portable Classroom Study	54
2. School Bus Study	55
D. School Site Programs	
1. Guidance for Risk Assessments at Schools	57
2. Evaluating Risks at School Properties	59
3. Integrated Pest Management at Schools	72
4. Playground Equipment and Surfacing Replacement	81
5. Art Hazards Program	89
III. Children's Environmental Health Studies	
A. Southern California Children's Health Study	91
B. Fresno Asthmatic Children's Environment Study	92
C. Children's Respiratory Health Study	93
IV. Activities of the Children's Environmental Health Center	95
V. References	
A. SB 25	97
B. AB 2872	106

## ***Executive Summary***

As part of his commitment to the electorate in 1998, Governor Gray Davis signed into law in 1999 and 2000 comprehensive legislation addressing environmental health issues affecting children. The Children's Environmental Health Protection Act originated in landmark legislation introduced by Senator Martha Escutia in Senate Bill 25 (Chapter 731, Statutes of 1999). Assembly Bill 2872 introduced by Assemblyman Kevin Shelley codified (Chapter 144, Statutes of 2000) Governor Davis' Children's Environmental Health Initiative. Governor Davis' program has two major themes. One focuses on exposures to environmental contaminants that occur outdoors, also referred to as "ambient" exposures, and the second focuses on schools and the classroom environment. These two pieces of legislation and their implementation by the California Environmental Protection Agency (Cal/EPA) provide California one of the strongest children's environmental health programs in the nation.

A consistent theme in environmental health policy has been the protection of members of the population that are most susceptible to the adverse effects of environmental hazards. By doing so, we ensure the protection of our larger society. Children may be more vulnerable to environmental contaminants than adults – primarily because of the biological susceptibility of their developing organ systems to chemical insults and the relatively greater doses received by children than adults from the same exposure concentrations to environmental contaminants. In this spirit, the Children's Environmental Health Protection Act requires that each of California's Ambient Air Quality Standards be re-evaluated to ensure that they are health protective of the most sensitive members of the population, including infants and children. The Act also requires that the State's list of Toxic Air Contaminants be reviewed to identify those that might cause infants and children to be especially susceptible to illness and to institute Air Toxic Control Measures (ATCMs) that would be needed to reduce exposures. There are many other elements to the Children's Environmental Health Program that are described in this report.

The Children's Environmental Health Protection Act created the Children's Environmental Health Center (CEHC) and charged it with providing overall leadership on matters related to protecting the State's children from environmental hazards, with special emphasis on air pollution. It also specified tasks to be accomplished by the Center in collaboration with the Air Resources Board and the Office of Environmental Health Hazard Assessment within the Cal/EPA. A key responsibility of the CEHC, stipulated by Sec. 900 (d) of Part 3 of Division 1 of the Health and Safety Code (HSC), is to report to the Governor and Legislature on the accomplishments related to protecting children's health under the mandates of the Children's Environmental Health Protection Act. The HSC also requires the CEHC to report to the Governor and the Legislature on the implementation of Sec. 901 (the Governor's Initiative) as part of the report on implementation of the Children's Environmental Health Protection Act. Within Cal/EPA there are five boards, departments and an office that implement the Children's Environmental Health Program (SB 25 and AB 2872) from a cross-media perspective. This combined report is submitted by the CEHC as the initial fulfillment of the two biennial reporting requirements.

This report is comprised of an executive summary and six chapters. Chapter I presents updates on the implementation of SB 25, Chapter II focuses on the elements of the Governor's Initiative contained in AB 2872, and Chapter III provides a synopsis of a number of State-sponsored children's environmental health studies. Chapters I through III are each formed from a compendium of reports, prepared by the various Cal/EPA boards, departments, and office in collaboration with the CEHC. The fourth chapter

reports on the activities of the CEHC since its formation in January 2001. Chapter V includes, for reference, copies of the legislation creating the CEHC and the mandates to each of the boards, departments and office responsible for implementing the Children's Environmental Health Protection Act. This executive summary only highlights the statutory requirements and accomplishments of Cal/EPA's children's environmental health programs, the reader is encouraged to read each board, department, or office's summary of their accomplishments for the first two years and goals for the next two years.

## **Sec. I Implementation of Ch. 731, Statutes of 1999 (SB 25)**

### **A. Review of California's Ambient Air Quality Standards for Criteria Air Pollutants**

The Children's Environmental Health Protection Act requires the California Air Resources Board (ARB), in consultation with the Office of Environmental Health Hazard Assessment (OEHHA), to review all health-based California Ambient Air Quality Standards (CAAQS) by no later than December 31, 2000. The purpose of the review was to determine whether the standards, based on public health, scientific literature, and exposure pattern data, adequately protect the health of the public, including infants and children, with an adequate margin of safety. HSC § 39606(b) requires the Office of Environmental Health Hazard Assessment (OEHHA), when making recommendations to the Air Resources Board (ARB) on the health-based CAAQS for the eight Criteria Air Pollutants (CAPs), to assess to the extent that information is available: (1) exposure patterns among infants and children that are likely to result in disproportionately high exposure to ambient air pollutants in comparison to the general population; (2) special susceptibility of infants and children to ambient air pollutants; (3) the effects on infants and children of exposure to ambient air pollutants and other substances that have a common mechanism of toxicity; and (4) the interaction of multiple air pollutants on infants and children, including the interaction between criteria air pollutants and toxic air contaminants (TACs).

The review of the criteria air pollutants and associated AAQS was completed and approved by the Governing Board of the ARB on December 7, 2000. The focused reviews indicated that health effects may occur in infants, children, and other potentially susceptible subgroups exposed to pollutants at or near levels corresponding to several of the California AAQS. The pollutants were placed into two tiers, with the first representing greater potential risks to public health at current ambient air concentrations or the current air quality standards. The first tier includes particulate material less than 10 micrometers (microns) in aerodynamic diameter (PM<sub>10</sub>), sulfate (as a subset of PM), ozone, and nitrogen dioxide.

PM<sub>10</sub> is a heterogeneous mix consisting of both fine particles (PM<sub>2.5</sub> or particles 2.5 microns in diameter or less) and coarse particles (2.5 to 10 microns in diameter). Fine particles primarily result from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces and wood stoves, and agricultural burning. Coarse particles generally emanate from sources such as windblown dust, unpaved roads, materials handling, and crushing and grinding operations. The PM<sub>10</sub> 24-hour standard of 50 ug/m<sup>3</sup> is often exceeded throughout the State. A large body of epidemiological studies indicates an association between current ambient concentrations of PM<sub>10</sub> and a suite of adverse outcomes including changes in lung function, respiratory symptoms, asthma exacerbation, doctor visits, emergency room visits, hospital admissions, and premature mortality. The more severe outcomes are experienced primarily by the elderly and by people with pre-existing chronic heart or lung disease. However, several epidemiological studies suggest that children under age 5, and possibly under age 1,



may also experience severe adverse responses from exposure to PM<sub>10</sub>. Studies have found associations between PM<sub>10</sub> and changes in lung function, asthma, respiratory symptoms, doctor visits, and premature mortality in this subgroup. The review of the scientific literature on PM<sub>10</sub> indicates that adverse health effects could occur when ambient concentrations are near, and possibly below State standards of 30 µg/m<sup>3</sup> (annual average) and 50 µg/m<sup>3</sup> (24-hour average). A technical support document completed in December 2001 describes findings from a full review of the literature and makes health-based recommendations for the PM<sub>10</sub> AAQS. Recommendations to the Governing Board of ARB by Spring of 2002 may include differentiating between coarse and fine fractions in future PM standards, and whether a separate standard is necessary for sulfates since they are part of the particulate material in ambient air.

Ozone is the second criteria air pollutant that will undergo extensive review for revision of the CAAQS. Ozone is an important component of smog formed by the interaction of sunlight, nitrogen oxides and hydrocarbons in the air. It is an eye and respiratory irritant and has been associated in a number of studies with exacerbation of asthma, decreased lung function measured in both children and adults, and possibly impacts on lung function development in children. The scientific literature on ozone indicates the potential for biologically significant effects when exposure concentrations are at or below the current State standard of 0.09 ppm (1-hr average). Several factors may render children and young adolescents more susceptible to ozone exposure, including activity and exposure patterns, higher doses per unit of body weight and lung surface area, and the potential for effects on lung growth and development. A large fraction of California's population resides in areas in which ozone concentrations occur at or above the current State standard, primarily during daylight hours in the summer. Any recommended change to the ozone standard would be considered by ARB's Governing Board prior to December 31, 2003.

The third criteria air pollutant prioritized for review is nitrogen dioxide (NO<sub>2</sub>). Nitrogen dioxide is formed during combustion of automotive fuel, natural gas, and other materials. Nitrogen dioxide has been shown to exacerbate asthma and irritate the respiratory tract and eyes. However, recent studies suggest that exposure to NO<sub>2</sub> at concentrations only slightly above the current state one-hour standard of 0.25 ppm sensitizes bronchial or airway responses to challenge with common aeroallergens (e.g., pollen grains and mold spores) in subjects with allergic asthma. Nitrogen dioxide exposure could therefore render asthmatics more susceptible to effects from other environmental exposures. Though recent trends suggest nearly complete statewide compliance with the current AAQS, recent clinical and epidemiological studies suggest examination of the basis for the standard is warranted. The review is scheduled for completion by December 31, 2004.

The second tier of criteria air pollutants whose CAAQS will be considered in 2005 include lead, carbon monoxide, hydrogen sulfide, and sulfur dioxide. While these chemicals can have adverse health effects in children, on a statewide basis, exposures were considered either very limited or less threatening than for chemicals in the first tier.

## **B. Evaluating the Adequacy of California's Air Monitoring Network**

California's extensive ambient air quality monitoring network, which is also part of a nationwide network of monitors, was designed to measure regional levels of pollutant concentrations in the outdoor air. The primary purpose of the network is for determining which areas of the State are in attainment or not in

attainment (non-attainment) with health-based State and federal air quality standards. The network also provides the data required for identifying and evaluating locations in the State where there may be high levels of toxic air contaminants (TACS). The information provided by the network helps determine what air pollution control programs and strategies are needed, and to evaluate the success of air pollution reduction programs.

The ambient air-monitoring network has been most useful in assessing regional levels of air pollution in California. However, the network may not in all cases adequately represent specific locations, outdoors or indoors, where children spend time and where they are potentially exposed to harmful air pollution. Because there is incomplete information on exposures infants and children might experience, it is difficult to adequately assess the potential health impacts of air pollution. As part of the effort to meet the California Children's Environmental Health Protection Act's goal of ensuring the State's air quality standards and airborne toxic control measures adequately protect the health of infants and children, the Act requires the Air Resources Board (ARB) to accomplish the following by January 1, 2003:

- Evaluate the adequacy of the current outdoor air quality monitoring network for its ability to gather the data necessary to determine the exposure of infants and children to air pollutants including criteria air pollutants and toxic air contaminants.
- Identify areas where the exposure of infants and children to air pollutants is not adequately measured by the current monitoring network.
- Recommend changes to improve air pollution monitoring networks and data collection to more accurately reflect the exposure of infants and children to air pollutants.

The Act also stipulates that for the purpose of sampling air pollution in locations where children spend time, the ARB, in cooperation with local air quality districts is to expand its existing monitoring program to include six communities in non-attainment areas around the state. It specifies that the expansion is to include:

- Special monitoring of children's exposure to air pollutants and toxic air contaminants.
- Placement of air pollution monitors near schools, daycare centers, and outdoor recreational facilities that are in close proximity to, or downwind from, major industrial sources of air pollutants and toxic air contaminants, including, freeways and major traffic areas.
- Monitoring during multiple seasons and at multiple locations within each community at schools, daycare centers, recreational facilities, and other locations where children spend most of their time.
- A combination of approaches to provide the most comprehensive data possible on the levels of children's exposure to air pollutants and toxic air contaminants. These approaches include: upgrades to existing fixed (i.e., not mobile) monitoring sites, establishment of new fixed monitoring sites, conducting indoor/outdoor air sampling, and personal exposure measurements in each community.

To date, the ARB has identified six communities and the locations within those communities at which to monitor. Monitoring in each of the communities is in different stages. Working closely with the local air pollution control districts and community groups, the ARB selected the six communities using a two-step process. The first step consisted of a general evaluation of candidate communities. This was done using information available in ARB's data system, and involved evaluating locations in the State where mobile and industrial sources are concentrated and where emissions from those sources might pose a

risk for children living or playing downwind. An initial set of criteria was developed to help guide these efforts. These included: communities suggested by local air districts, citizens, and environmental groups, proximity to existing monitoring sites for air toxics and special monitoring studies, potential for coordination with planned or ongoing health studies, how representative a community was of regional exposure, and overall air quality of the region and community. A second set of criteria was then applied to make the final selection of specific communities and possible monitoring sites. These criteria included: location of schools and commercial day care centers; proximity of major industrial sources and high risk facilities; proximity of freeways or major traffic areas; and review of data from other databases, such as business permits and air quality data.

The final six communities chosen include Barrio Logan (San Diego); Boyle Heights (Los Angeles); Wilmington (Los Angeles); Fruitvale (Oakland); Crockett; and Fresno. These six areas exemplify the diversity of weather, geography and air pollution sources present in California where emissions from diesel exhaust, automobiles, neighborhood sources, refineries and marine sources can affect air quality. Fresno is part of an ongoing monitoring program associated with the Fresno Asthmatic Children's Environment Study (FACES). (See below and Section III for further information on FACES.) Specific details regarding each community, including status of the monitoring efforts, are provided in Section I-B of this report. The Bay Area Air Quality Management District (BAAQMD) and the South Coast Air Quality Management District are collaborating with the ARB in some of these monitoring efforts.

Each community will have a central air quality monitoring site, with the capacity to measure a comprehensive suite of pollutants, including criteria and non-criteria pollutants (such as toxic air contaminants [TACs]) and meteorological parameters. In addition to the central site, there will be more focused satellite sites. The choice of pollutants measured is based on those pollutants expected to be present in the community. Some non-criteria pollutants can act as indicators of a specific emission activity or category of emission source. These pollutants include total non-methane hydrocarbons, elemental and organic carbon, black carbon, and PM species. These can be associated with motor vehicles, certain industries, or diesel emissions. Toxic gases and metals included in the monitoring include known carcinogens such as 1,3-butadiene, benzene, formaldehyde, and hexavalent chromium.

In addition to outdoor measurements, indoor air and personal exposure monitoring will be conducted inside classrooms during the 2001-2002 school year in three of the selected SB 25 communities. The University of California, Los Angeles, under contract to the ARB, will measure pollutants inside school classrooms, at a single location on the school grounds, and in a few residences. Measurements will be taken at Hollenbeck Middle School in Boyle Heights, Wilmington Park Elementary School in Wilmington, and one northern California school. Pollutants to be measured include particulate matter, toxic gases, including formaldehyde and related compounds. A subset of students will wear small monitoring devices ("badges") to measure their personal exposure to toxic gases over a 48-hour period. The contractor will also administer a health status survey to students in the monitored classrooms to determine any pre-existing asthma and/or allergies. The study began Fall 2001, and field measurements are scheduled to conclude at the end of the school year in June 2002. Approximately one-third of the monitoring will be completed by January 2002. An interim report of preliminary findings from the first two seasons of fieldwork will be prepared in May 2002, with the final report on the entire project due in March 2003.

The information being gathered in the six communities is critical to evaluating the existing air quality monitoring network's adequacy to assess children's exposures. It will enhance our understanding of how well routine network measurements of regional ambient air relate to pollutant concentrations in specific locations where children spend time. The additional data will provide guidance on whether different types of measurements need to be added to the existing monitoring network. The insights provided by these monitoring efforts will be used to guide public health policy that relates to assessing children's exposures to air pollution, and to mitigating those exposures. The recommendations arising from this element of the Program will be published in January 2003 after all the data have been collected and fully evaluated.

### **C. Review of Toxic Air Contaminants**

#### **List of Toxic Air Contaminants of Concern for Children**

The HSC § 39650 *et seq.* requires the Office of Environmental Health Hazard Assessment (OEHHA) to develop a list (the List) of up to five TACs that may cause infants and children to be especially susceptible to illness. The ARB must then review affected airborne toxic control measures (ATCMs) for these five TACs by July 2003 to ensure they adequately protect infants and children. If there are no existing control measures for a TAC on the List, the ARB must prepare a "needs assessment" and adopt appropriate control measures by July 2004.

The Office of Environmental Health Hazard Assessment conducted preliminary assessments of all identified TACs (includes about 200 chemicals or chemical classes). Using information on health effects, ambient air concentrations, and emissions sources, 36 TACs were identified and prioritized for focused literature searches. The review of the literature evaluated information on the potential for differential impacts on infants and children as compared to adults. Because children are still developing physiologically, chemicals that affect the nervous system, respiratory system, immune system, endocrine and reproductive organs, and exhibit developmental toxicity would be expected to impact children more than adults. Thus, those TACs that are neurotoxicants, endocrine disruptors, immunotoxicants, respiratory system toxicants, and developmental toxicants were of most concern during the initial assessment. Exacerbation of asthma was included as a toxicological endpoint of particular concern because asthma surveillance and hospitalization data indicate that children, especially young children, are impacted by asthma illness more than adolescents and adults.

Of the 36 TACs that underwent focused literature reviews, five were listed under the requirements of HSC § 39669.5(a) as possibly causing infants and children to be especially susceptible to illness. These are: polycyclic organic matter (POM) or polycyclic aromatic hydrocarbons (PAHs), lead, polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) (collectively identified as "dioxins"), particulate emissions from diesel-fueled engines, and acrolein. There were four meetings of Cal/EPA's Scientific Review Panel on Toxic Air Contaminants at which the List of TACs was discussed. The final technical support document (Prioritization of Toxic Air Contaminants under the Children's Environmental Health Protection Act) discusses the five chemicals (or class of chemicals) on the initial list of TACs. The document also discusses a second list of TACs for which there are concerns about impacts on infants and children. The OEHHA is required to update the List by July 1, 2005, although it may be updated sooner. Future lists may include more than five chemicals.

## **Review of Air Toxics Control Measures**

The HSC § 39669.5(b) requires the ARB to review and revise any control measure adopted for the TACs on the List established by OEHHA within two years (July 2003). The goal of the air toxics program is to reduce to the maximum extent feasible, or eliminate when possible, exposures to toxic air pollutants to all Californians, including infants and children. For any TAC on the List for which there are no existing control measures, the statutes require the ARB to prepare a needs assessment report and adopt control measures, as appropriate, within three years (July 2004). As noted above, to date, the five TACs included on the List for which these actions must be taken are: acrolein, particulate matter from diesel-fueled engines (Diesel PM), dioxins, lead, and POM.

Of the five TACs listed as making children more susceptible to illness, the ARB has airborne toxic control measures (ATCMs) for two that will be reviewed by July 2003. These two ATCMs were developed to reduce emissions of dioxins and lead. ARB will update the needs assessments of both chemicals with current emissions information. Both ATCMs are scheduled in 2002 for public workshops and public comment. ARB's Governing Board will be advised of findings and recommendations. Three of the TACs identified by OEHHA do not have control measures. Therefore, the ARB is required to prepare a needs assessment report and adopt control measures, as appropriate, by July 2004 for acrolein, diesel PM, and POM.

## **Sec. II Governor's Children's Environmental Health Initiative**

### **A. Cancer Risk Assessment for Children**

The Office of Environmental Health Hazard Assessment is required to review cancer risk assessment guidelines (HSC § 901(b)) for use by the Office and the other entities within Cal/EPA to establish cancer potency values or numerical health guidance values that adequately address carcinogenic exposures to the fetus, infants, and children (due June 30, 2001). The HSC § 901(c) requires OEHHA to review existing state and federal cancer risk guidelines, as well as new information on carcinogenesis, and to consider the extent to which those guidelines address risks from exposures occurring early in life (Due June 30, 2001).

The OEHHA completed the review of existing federal and state cancer risk guidelines. The extent to which any of these guidelines addresses exposures early in life is extremely limited, with the exception of the U.S. EPA's July 1999 draft revised "*Guidelines for Carcinogen Risk Assessment*." These guidelines address the need for dose adjustments (from adults to children) when estimating cancer risks from children's exposures by certain routes, but do not provide guidance on age-dependent adjustments for differential responses of individuals exposed early in life. The July 1999 draft revised guidelines are currently under revision by the U.S. EPA and will be re-evaluated by OEHHA when the revisions are completed.

The HSC § 901 (d)(1) requires OEHHA to develop criteria for identifying carcinogens likely to have greater impact if exposures occur early in life (due June 30, 2004). The Office has drafted an initial version of criteria for such carcinogens, but additional work is needed before they are released for review. The Office is also required to assess methodologies used in existing guidelines to address early-in-life exposures (HSC § 901 (d)(2)) (due June 30, 2004). The Office has evaluated current

federal and state cancer guidelines used to estimate excess cancer risk and has determined that they do not use methodologies or mathematical models that address early-in-life exposures. Such methodologies and models remain to be developed. In addition, OEHHA is required to construct a database of animal studies to evaluate increases in risks from short-term early-in-life exposures (HSC § 901 (d)(3)) (due June 30, 2004). Two databases have been constructed to evaluate increased risk from early-in-life exposures. The first was developed by OEHHA and contains over 850 individual studies identified as potentially providing adequate data for comparison of cancer risk following administration of carcinogenic agents at different time periods, e.g., prenatal and perinatal, childhood, and adulthood. The second database prepared under contract to OEHHA contains approximately 5,500 studies involving about 800 chemicals from 2,000 scientific journal articles that will allow evaluation of a large number of parameters that may affect tumorigenesis. Finally, the Office is required to complete and publish children's cancer guidelines that shall be protective of children's health (HSC § 901 (e)) by July 1, 2004. Efforts are underway to assess and characterize the effects on excess lifetime cancer risk of early-in-life exposures to different carcinogens. These efforts are central to the development of the children's cancer guidelines.

## **B. Contaminants of Greatest Potential Health Concern at Schools**

The HSC § 901 requires OEHHA, in consultation with the appropriate entities within Cal/EPA, on or before January 1, 2002, to identify those chemical contaminants commonly found at school sites and determined to be of greatest concern based on criteria that (1) identify child-specific exposures and (2) child-specific physiological sensitivities. The Office has identified two groups of candidate chemicals and created two lists: one for chemicals with the likelihood of occurring at school sites (approximately 200 chemicals) and the other for chemicals having the potential to cause adverse effects in school-age children (approximately 190 chemicals). These are "working" compilations of chemicals that will serve to direct data-gathering and in-depth literature reviews which will facilitate the prioritization of chemicals for development of numerical health-based values.

The HSC § 901(g) stipulates that by December 31, 2002, and annually thereafter, OEHHA shall develop numerical health-based guidance for five chemicals from the above list until the list is exhausted. The Office will select a subset of chemicals that appear on both of the candidate chemical compilation lists to determine if there are sufficient data on critical toxic effects in the developing organ systems of children to support development of child-specific numerical guidance values based on non-cancer health effects.

## **C. Children's Environmental Exposure Studies**

### **Portable Classroom Study**

Across the State, the installation of portable classrooms has provided a relatively efficient solution to classroom overcrowding. However, there have been reported environmental problems in some of these classrooms, including formaldehyde, mold, and ventilation problems. Chapter 144, Statutes of 2000 (AB 2872) and HSC § 39619.6 require the ARB and the California Department of Health Services (DHS) to evaluate conditions in California's classrooms. The evaluation is being accomplished through a contract with Research Triangle Institute. The focus of the work is on ventilation systems and how they are operated, indoor air quality, and identification of any toxic contaminants, including molds and allergens. An initial phase of the evaluation that involved the administration of a mailed survey and the

measurement of formaldehyde in nearly 1,000 schools statewide has been completed. Phase II of the effort includes collecting environmental data, such as formaldehyde and related gases, other gaseous pollutants (e.g., benzene, chloroform, carbon monoxide), particle counts, molds and allergens, and temperature and humidity at two portable classrooms and one traditional classroom in each of 70 schools selected at random. Floor dust samples are also being collected and analyzed for environmental hazards, and additional survey data are being collected. Results of this project are expected to be available in early summer 2002.

### **School Bus Study**

To improve estimates of children's pollution exposures during school bus commutes, the ARB is sponsoring a study of pollutant levels in and near school buses. The measurements are designed to capture information on exposures that children might experience on different types of buses and under different traffic densities and roadway conditions. A pilot study is almost complete, and the results of the main study are expected by June 2003.

The Portable Classroom Study and the School Bus study will provide critical information on potential exposures in locations where children spend substantial amounts of time. This information can be used to guide policies designed to protect children from harmful exposures in these locations. In addition, these data can be used in health studies, such as the southern California Children's Health Study and the Fresno Asthmatic Children's Environment Study, described below and in Section III, to improve exposure estimates and thereby obtain more reliable estimates of health risks posed by specific air pollutants.

## **D. School Site Programs**

### **School Site Multimedia Exposure and Health Risk Assessment**

The HSC § 901(f)(1) requires the Office of Environmental Health Hazard Assessment to publish a guidance document, for use by DTSC and other state and local environmental and public health agencies to assess exposures and health risks at existing and proposed school sites on or before December 31, 2002.

The Office is developing a framework for a multimedia, multi-pathway risk assessment (MMRA) for use within Cal/EPA. From among the many exposure pathways encompassed by the MMRA framework, those that are relevant to a school setting will be selected for incorporation into a school exposure scenario. The Office will further develop this into a specific mathematical model to assess exposures to children while at school.

Because schools represent a unique exposure environment, an additional set of exposure factors will be required. For example, building characteristics, the age of the building structures, and activity patterns of the school users may differ from typical occupational or residential settings. The Office is evaluating the availability of data to support school-specific exposure factors. Since it will not be possible to develop reliable estimates for all school-specific exposure factors by December 31, 2002, some may have to be estimated based on approximations of other better characterized exposure scenarios. The Office plans to sponsor focused research to aid in developing school-specific exposure factors for at

least six exposure pathways. Further progress in developing a school site risk assessment model can be made when information for these exposure factors becomes available.

### **Evaluating Risks at School Properties**

Assembly Bill 387 Wildman "School Site Contaminants Act", Chapter 992 Statutes of 1999 and Senate Bill 162 Escutia "School Facilities Act" Chapter 1002 Statutes of 1999 passed into law on January 1, 2000 require the Department of Toxic Substances Control (DTSC) to participate in the environmental review process for the proposed acquisition of and/or construction on school properties, including expansions and additions, where state funding is utilized. The new laws codified the process for environmental review and named DTSC as the lead agency for evaluating school properties. These new "school construction laws" address concerns raised by parents, teachers, local communities, and the Legislature over school properties that are, or may have been contaminated by hazardous materials and thereby pose a potential health threat to children and staff. The legislation also expanded DTSC's authority to evaluate naturally occurring hazards, such as petroleum deposits and naturally occurring asbestos in serpentine rock formations. In response to this legislation, DTSC implemented a specific program, the School Property Evaluation and Cleanup Division (Schools Program), to provide the regulatory process for review of school sites. Branches of this program are located in DTSC offices in Sacramento, Glendale, and Cypress.

The school site review process consists of three steps. These steps follow the previous site evaluation process used by the Department of Education (Phase I and Phase II evaluations), but now include requirements from State Superfund legislation and USEPA CERCLA (United States Environmental Protection Agency Comprehensive Environmental Response, Compensation, and Liability Act). Phase I is conducted in accordance with the *American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. The DTSC supplemented the ASTM Standard to address naturally occurring and anthropogenic sources of hazardous materials. As of December 2001, the Schools Program evaluated over 509 Phase I assessments. Of these Phase I assessments, approximately 60% required a second step for further environmental investigation in the form of a Preliminary Endangerment Assessment (PEA). The PEA assumes that there will be no restrictions on land use, meaning it would be suitable for residential development. This screening approach provides an assessment of exposures to children, assumes exposure factors representative of a small child, and includes long-term exposures to adults and older children. Thus, this exposure scenario assumes that an individual lives on the site both as a child and as an adult (a "conservative" assumption that tends to overestimate exposures to offset any uncertainties in children's exposure and risk factors compared to those of adults). All detected chemicals at the site are evaluated in the risk assessment, except for those metals that occur at or below background concentrations for the site (see below for issue related to background concentrations). The DTSC also has authority to evaluate and mitigate naturally occurring conditions that could pose a potential health risk to the students and staff (see below). The third step of the environmental review is to take remedial action when appropriate. The DTSC has conducted eight remedial actions at proposed school sites, most requiring soil removal, and has approximately 20 projects currently pending action.

Determining background concentrations of naturally occurring metals in soil is important in determining cleanup levels where other sources have contributed to the total soil loading. Arsenic concentrations in



background soils are particularly problematic, since background levels in many areas are above the excess lifetime cancer risk screening level of one in one million ( $1 \times 10^{-6}$ ). It is not always feasible to cleanup below background level to achieve a more acceptable level of risk. The DTSC evaluated 550 soil samples from 17 proposed school sites in the Los Angeles Unified School District to determine a range of background levels identify a representative value that can be used as a cleanup goal. DTSC is currently evaluating background concentrations of other metals in the Los Angeles area.

DTSC was given broad authority to investigate other sources of potential exposures to chemicals that could impact the health of children on school sites. Some of these include former agricultural properties, former dairy properties, naturally occurring asbestos, buildings with lead-based paint, chlordane application sites, and sites overlying petroleum fields, including associated drilling activities and wastes. DTSC has evaluated potential school sites at each of these types of sites. Approximately 5% of the former agricultural sites have required some remediation of the soil because of pesticide residues. Most of these were organochlorine pesticides, with elevated levels of toxaphene being the most common pesticide requiring remediation. (Organochlorine pesticides, although long out of use, are environmentally persistent.) Arsenic contamination, associated with the use of arsenical pesticides, has also been frequently identified at these sites.

A significant finding by DTSC is the potential problem of hazardous material contamination at existing school properties. For example, DTSC investigated eight existing schools and required soil remediation at several of them. Considering that there are over 8,000 schools in California, most of them located in large cities with some of them built 30 to 40 years ago, there may be a significant number requiring some form of cleanup. However, unless an existing school is proposing new construction, there is no current mandate requiring a systematic environmental review of these schools. An outcome of DTSC's environmental overview has been the motivation of school districts to become more selective in evaluating potential school properties; and, it has enabled community members and parents to have a more active participatory role in selection of school properties.

### **Integrated Pest Management (IPM) at Schools**

The Healthy Schools Act (AB 2260 Shelly "School Safety" Chapter 718 Statutes of 2000) took effect January 1, 2001. This law put into the Education Code and Food and Agricultural Code the Department of Pesticide Regulation's (DPR) existing voluntary California School IPM Program. It also adds new right-to-know requirements regarding pesticides, such as notification, posting, record keeping for schools, and enhanced pesticide use reporting for licensed pest control businesses. The Healthy Schools Act promotes effective least-hazardous IPM as the State's preferred method of school pest control. It defines this approach as "... a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using non-chemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property, and the environment, are used only after careful monitoring indicates they are needed" (FAC § 12181-13182).

Through its School IPM Program, DPR is committed to facilitating voluntary establishment of IPM policies and programs in schools throughout California, while assisting school districts with

implementation of the new Education Code requirements. The DPR is assisting schools by: establishing an "IPM in Schools" Web site ([www.cdpr.ca.gov](http://www.cdpr.ca.gov), select "School IPM"); identifying and training individuals designated by school districts to carry out school IPM; assisting school districts to establish IPM policies and programs; developing a model IPM program guidebook; and evaluating adoption of IPM in schools. In addition to these activities, the law adds new requirements to the Education Code (EC § 17608–17613) to be implemented in the 2001–2002 school year. Among other requirements, school districts must now provide annual written notification, including specified information on pesticides, to all school staff and parents or guardians of students. In addition, each school district is to designate an individual (also known as an IPM coordinator) to carry out these requirements. To assist school districts, DPR's Web site has samples that can be downloaded of an annual notification form, a letter to parents or guardians of students about how to register to be notified for each specific pesticide application, and a warning sign districts post when they apply pesticides.

The Food and Agricultural Code § 13180–13185 added requirements for DPR to: (1) prepare a school pesticide use reporting form to be submitted annually by licensed pest control businesses when they apply any pesticides at a school; (2) establish and maintain a School IPM Web site that contains information on pesticide products, a comprehensive directory of resources describing and promoting least-hazardous pest management practices at schools, the model program guidebook, and ways to reduce the use of pesticides at school facilities; and (3) encourage the voluntary adoption of IPM programs by school districts. In support of (2), the Davis Administration earmarked \$380,000 in fiscal 2001-02 to develop a component on DPR's Web site that allows school districts to easily and properly identify and list the active ingredients of pesticide products they expect to be applied during the upcoming year. As part of its Children's Environmental Health Initiative in support of (3), the Davis Administration earmarked \$634,000 in fiscal year 2000-01 for DPR to further develop voluntary school IPM programs. In 2000, DPR created a School IPM Advisory Group, consisting of 30 key school organizations and other interested stakeholders, that informally advises DPR about California School IPM Program elements. The DPR co-sponsored with the Marin County Department of Agriculture a regional School IPM Expo in Novato. The Expo, hosted by the Novato Unified School District on July 18, 2001, reached over 19 school districts, six cities, and 18 counties. The DPR staff has made over 50 presentations statewide providing information on the Healthy Schools Act, the components of DPR's California School IPM Program, and an introduction to IPM.

The DPR works with other boards and departments within the Cal/EPA and with the Department of Education to tie IPM into related areas such as school gardens and environmental education. DPR also works with the U.S. EPA, which recently made a two-year award to DPR for \$150,000 through its Urban Initiative Program. The award will be used in part to address home use of pesticides that may include illegal (unregistered) pesticides, or legal pesticides that are misused or disposed of improperly. This year, DPR awarded most of the U.S. EPA funding to the Aquatic Outreach Institute (AOI) for an environmental education program, "Watching Our Watersheds." The group will develop train-the-trainer workshops for sixth- through twelfth-grade teachers in an area that includes Alameda, Contra Costa, and San Francisco counties. Teachers will receive training in safe use and disposal of pesticides, as well as IPM for homes, gardens, and schools. IPM stresses working with nature to encourage a healthy environment with minimal pest problems. The DPR is also funding AOI through its competitive Pest Management Grant Program to conduct school garden workshops. The workshops draw kindergarten through twelfth-grade teachers who learn about soil, composting, plant propagation, and IPM. Now in its second year, AOI is expanding on the program to include San Francisco Park and Recreation

Department staff, who will create after-school gardening programs that incorporate IPM. The DPR awarded AOI \$80,000 over a two-year period for six two-day workshops, in which 180 educators will be trained.

### **Playground Equipment and Surfacing Replacement**

The California Integrated Waste Management Board (CIWMB) administers grant programs directed towards the upgrade and improvement of playground and other recreational facilities where children of all ages spend time. The unique aspect of these programs is that they require fifty percent (50%) of the grant funds allocated to the project be used for the purchase or installation of products made of recycled-content materials. These programs are briefly summarized below.

- ◆ *Playground Safety and Recycling Act Grant Program (Chapter 712, Statutes of 1999; AB 1055).* This program provides grants to public educational agencies for the purpose of upgrading the State's public playgrounds to prevent injuries in compliance with the California Department of Health Services (DHS) regulations (HSC § 115725; California Code of Regulations (CCR) Title 22, Division 4, Chapter 22). The applicant must provide a fifty percent (50%) match of the grant funds for the project to be considered. The percentage match can be reduced to 25% if the applicant can demonstrate an extreme hardship presented by a 50% match. The Fiscal Year 1999/2000 Budget Act allocated two million dollars of Proposition 98 education funds for this program. A competitive solicitation in 2000 resulted in 394 qualifying applications, of which 213 received a passing score. The cost to fund all passing applications would have been nearly \$4.8 million dollars, far in excess of the \$2 million available. The available funds were awarded to 36 applications from northern California and 54 from southern California, which were chosen from all passing applications using a random selection process.
- ◆ *Park Playground Accessibility and Recycling Grant Program (Established by the Safe Neighborhoods, Clean Water, Clean Air, and Coastal Protection Bond Act of 2000).* This Act provides grants to park districts for the purpose of bringing public playgrounds into compliance with State and federal accessibility standards and to satisfy playground safety regulations (HSC § 115725). The Budget Acts for Fiscal Years 2000/2001 and 2001/2002 each included an allocation of \$2.558 million dollars for this program, which will be distributed in two funding cycles. For the first funding cycle, now complete, 56 of 84 submitted applications received passing scores and were awarded a total of \$2,543,100. The second funding cycle is in progress and scheduled to be completed by April 2004.
- ◆ *Waste Tire Playground Cover Grant Program and Waste Tire Track and Other Recreational Surfacing Grant Program.* Both of these Programs were initiated by CIWMB as part of their implementation of the Tire Recycling Act (Chapter 974, Statutes of 1989). The CIWMB receives an annual appropriation from the California Tire Recycling Management Fund, a portion of which is allocated to these two Grant Programs. Public entities, including cities, counties, colleges, universities, state owned recreational facilities, public school districts, qualifying California Indian tribes, park districts, and special districts can receive grants. These grants are for the purpose of laying surface materials (including those manufactured from California waste tires): (1) underneath or around playground equipment (Playground Cover Grant Program) or (2) underneath or around recreational sites, defined as an area designed, equipped and set aside for the public's recreation,

such as running tracks, tennis courts, skateboard parks, swimming pools, various types of sports fields, weight rooms and fairgrounds (Track and Other Recreational Surfacing Grant Program). For each of five years, through Fiscal Year 2005/2006, \$800,000 and \$1,000,000 have been allocated to the Playground Cover Grant Program and the Track and the Other Recreational Surfacing Grant Program, respectively. In the first funding cycle, 44 grants were awarded for playground cover and other recreational surfacing projects.

These Grant Programs benefit children directly by improving the safety, accessibility and quality of the facilities in which they play. They benefit children indirectly by helping to maintain the quality of the environment for which they will assume responsibility as adults. Taken together, these programs provide generous support, however, the need substantially outweighs the available resources for the Playground Safety and Recycling Grant Program and the Park Playground Accessibility and Recycling Grant Program.

### **Art Hazards Program**

Education Code (Article 6, § 32060) stipulates that school districts are not to purchase art or craft products containing toxic or carcinogenic substances for use in grades K through 6. Such products can be used in grades 7 through 12 if they are adequately labeled advising the user of the presence of hazardous ingredients, the potential health effects, and instructions for safe use of the art or craft products. The OEHHA, Integrated Risk Assessment Section (IRAS) has compiled a list, which is updated quarterly, of products that cannot be purchased. These guidelines assist both public and private schools in California to assure that schoolchildren are not exposed to hazardous substances that may be contained in some art and craft materials, thereby better ensuring the safety of school children.

## **Sec. III Children's Environmental Health Studies**

A number of research studies are in progress that are focused on children's environmental health issues. These projects are sponsored and/or conducted by the ARB or the OEHHA. The highlights of each are presented here.

### **A. Southern California Children's Health Study**

The study that has been in progress the longest is the landmark Southern California Children's Health Study (CHS), which is being conducted by a multi-disciplinary research team centered at the University of Southern California. This study, initiated in 1991 under the auspices of the ARB's Long-term Exposure Health Effects Research Program, is the first major study to examine the consequences on children's respiratory health of growing up in communities with different mixtures and concentrations of common air pollutants. The study focuses on three criteria air pollutants: ozone, nitrogen dioxide, and PM10; and the aggregate vapor phase concentrations of nitric, acetic, and formic acids.

The CHS is evaluating a very large number of children. In 1993, 1,800 fourth graders, 900 seventh, and 900 tenth graders were recruited from schools in twelve southern California communities. In 1996, another 2,000 fourth graders were recruited from these same communities. The communities differed in the concentrations of each of the pollutants being studied. All children in a classroom were eligible to participate in the study. Both healthy and asthmatic children were enrolled in the study. Children are

being followed for up to ten years, or through graduation from high school. Each child's respiratory health is assessed annually. This includes measuring lung function and collection of respiratory symptoms, illness data, and conditions in the home environment. A questionnaire is used to collect information about activity patterns and time spent outdoors.

The study has yielded important insights into the impacts of long-term air pollution exposures on children's lung function and respiratory health. Analyses of the first four years of data found that children living in communities with higher levels of nitrogen dioxide, particulate matter, and acid vapors have significantly lower rates of development in lung function. While ozone was not associated with deficits in lung function growth, the CHS found short-term ozone exposures were associated with significant increases in school absences resulting from acute respiratory illness. Children with asthma who are exposed to elevated levels of PM are more likely to develop bronchitis. Additional important findings are anticipated when data analyses conclude in December 2003. The study has directly benefited children by providing information critical to the evaluation of California's ambient air quality standards under the SB 25 program.

### **B. Fresno Asthmatic Children's Environment Study**

The Fresno Asthmatic Children's Environment Study (FACES), sponsored by ARB's Vulnerable Populations Research Program, was initiated in February 2000 by a team of investigators centered at the University of California, Berkeley. The study will seek to define and understand how repeated acute responses to short-term exposures to air pollution might influence the progression of asthma among 300 school-age children already diagnosed with the disease. It is the first study to specifically focus on the long-term consequences of repeated short-term exposures. The children will be followed for about four-and-one-half years.

Fresno is a demographically diverse community with high asthma rates. Fresno also has high air pollution levels. FACES will measure children's exposures to a wide array of air contaminants, especially those associated with diesel and non-diesel vehicle emissions that are believed or known to trigger asthma attacks. Ambient environmental measurements will be made by the U.S. Environmental Protection Agency's "Supersite" monitoring station located in downtown Fresno. A second part of the project will include mobile monitoring trailers to obtain daily estimates of outdoor, indoor, and personal exposures. Early results from FACES are expected in the next two years. The study will be reviewed and considered by the ARB for continued funding in 2002. If the program is continued in 2003, final results should be available in early 2005.

### **C. Children's Respiratory Health Study**

The OEHHA is conducting a study that will compare the respiratory health, based on a one-time survey, of 1,100 children attending 10 different schools in three East Bay communities (Oakland, San Leandro, and Hayward). The schools were selected to reflect communities impacted more or less by traffic-related air pollutants. Respiratory health-related data collection concluded in August 2001 and air pollution measurements will be completed in December 2001. Results will be available in summer 2002.

#### **Sec. IV Activities of the Children's Environmental Health Center**

The Children's Environmental Health Center (CEHC), within the Cal/EPA Office of the Secretary, was created by the Children's Environmental Health Act (Chapter 731, Statutes of 1999). To implement the mandates of the Act, the CEHC is staffed by the Assistant Secretary for Children's Environmental Health and the Assistant Director of the Children's Environmental Health Center, who serves on a limited-term part-time basis through a special agreement with the Air Resources Board. Among its key responsibilities, the CEHC serves as the chief advisor to the Secretary for Environmental Protection and to the Governor on matters within the jurisdiction of the Cal/EPA relating to environmental health and environmental protection. It is tasked with coordinating within the Cal/EPA and with other state agencies, regulatory efforts, research and data collection, and other programs and services that impact the environmental health of children. It is also to coordinate Cal/EPA activities with the appropriate federal agencies conducting regulatory efforts and research and data collection. The CEHC is charged with reporting to the Legislature and the Governor on the progress in implementing the children's environmental health programs within Cal/EPA.

During the past year, the CEHC has made major strides in meeting these mandates. Center management has worked closely with the Cal/EPA boards', departments' and office's programs that address one or more aspects of children's environmental health and has facilitated communications and coordination among the Cal/EPA programs as well as other State, federal and local government children's environmental health programs. The CEHC has collaborated with the U.S. EPA on a number of projects, including research project reviews, and conferences. This report constitutes the first major product of the Center. During the next two years the CEHC plans to continue these efforts, and to increase its education and outreach to communities and families who may be especially impacted by environmental contamination.

## ***I. Implementation of Ch. 731, Statutes of 1999 (SB 25)***

### **A. Review of California Ambient Air Quality Standards**

#### ***1. Purpose and Requirements of the Legislation***

The Children's Environmental Health Protection Act (Chapter 731, Statutes of 1999 (SB 25)), requires the California Air Resources Board (ARB), in consultation with the Office of Environmental Health Hazard Assessment (OEHHA), to review all existing California health-based Ambient Air Quality Standards (AAQS) by no later than December 31, 2000. The purpose of the review is to determine whether the standards, based on public health, scientific literature, and exposure pattern data, adequately protect the health of the public, including infants and children, with an adequate margin of safety. This initial review was also intended to set priorities for more extensive reviews and possible revisions of those standards not considered sufficiently protective of public health, especially with respect to infants and children. The ARB is required to publish a report summarizing the findings of the initial review.

The statute (Health and Safety Code Sections 39606 (b)) requires the Office of Environmental Health Hazard Assessment, when making recommendations to the Air Resources Board on health-based Ambient Air Quality Standards for the Criteria Air Pollutants (CAPs), to assess to the extent that information is available (1) exposure patterns among infants and children that are likely to result in disproportionately high exposure to ambient air pollutants in comparison to the general population; (2) special susceptibility of infants and children to ambient air pollutants; (3) the effects on infants and children of exposure to ambient air pollutants and other substances that have a common mechanism of toxicity; (4) the interaction of multiple air pollutants on infants and children, including the interaction between criteria air pollutants and toxic air contaminants. There are eight criteria air pollutants (ozone, particulate matter, nitrogen oxides, sulfur oxides, hydrogen sulfide, sulfates, carbon monoxide, and lead), and 12 AAQS (some CAPs have two standards, one for short-term exposure and one for long-term exposure). Following prioritization of the standards for review, the OEHHA shall then provide a recommendation for a health-based standard of the highest priority criteria air pollutant and ARB is to revise the standard within two years of the completion of the prioritization (e.g., December 31, 2002) and then subsequently revise one standard per year until all California AAQS have been reviewed.

#### ***2. Accomplishments as of January 1, 2002***

##### **a. December 2000 Review of California Ambient Air Quality Standards**

An initial review was conducted and summarized in a December 2000 staff report entitled "Adequacy of California Ambient Air Quality Standards: Children's Environmental Health Protection Act." The review examined each standard's effectiveness in protecting health and then prioritized for a more extensive review and revision if necessary. The report is available at [www.arb.ca.gov/ch/ceh/airstandards.htm](http://www.arb.ca.gov/ch/ceh/airstandards.htm).

The initial review involved conducting a focused review of the literature on the health effects of exposure to each of the criteria air pollutants. The OEHHA utilized outside experts in the field as well as in-house expertise to conduct these reviews of the literature. The outside experts included Dr. John Balmes, University of California, San Francisco (ozone), Dr. Mark Frampton, University of Rochester Medical Center (nitrogen dioxide), Dr. Michael Kleinman, University of California, Irvine (carbon monoxide), Dr. Jane Koenig, University of Washington, Seattle (sulfur dioxide), Dr. Ira Tager, University of California, Berkeley (ozone), and Dr. George Thurston, New York University School of Medicine (particulate matter and sulfates). Hydrogen sulfide and lead were reviewed by OEHHA scientists. These research investigators are internationally recognized experts in the field of air pollution epidemiology and all have extensive experience evaluating data on the health effects of exposure to criteria air pollutants. The consultants' reports were reviewed by OEHHA scientists and developed into a document describing the health effects of criteria air pollutants including up-to-date information, where available, on impacts on infants and children. This report, entitled "Adequacy of California Ambient Air Quality Standards: Children's Environmental Health Protection Act", was reviewed by the Air Quality Advisory Committee (AQAC). This committee consists chiefly of scientists in California academic institutions that conduct research in the field. Members include: Dr. John Balmes, University of California at San Francisco, Dr. Henry Gong, University of Southern California, Dr. Russell Sherwin, Professor Emeritus, University of Southern California, and Dr. Michael Kleinman, University of California, Irvine. In addition, other experts participated in the review including Dr. Kent Pinkerton, University of California, Davis, Dr. Dennis Shusterman, University of California, San Francisco, and Dr. Mary White, U.S. Agency for Toxic Substances and Disease Registry. Following review by the AQAC, the report was presented to the Governing Board of the ARB and approved at their December 7, 2000 meeting.

Five factors were considered in assessing the standards' health protectiveness and prioritizing the need for further review:

- The extent of the evidence of effects reported to occur at or near the existing ambient air quality standard.
- The nature and severity of those effects.
- The magnitude of risk of effects anticipated to occur when ambient (outdoor) levels are at or near the level of the existing standard.
- Any evidence indicating that children may be more susceptible to effects than adults.
- The degree of outdoor exposure in California relative to the level of the standard.

The focused reviews indicate that health effects may occur in infants, children, and other potentially susceptible subgroups exposed to pollutants at or near levels corresponding to several existing California ambient air quality standards. Based on these factors, the pollutants were placed into two tiers, with the first representing greater potential risks to public health at the concentrations of the current air quality standards. The staff findings on the review of the California ambient air quality standards were presented to the Air Resources Board at the December 7, 2000 meeting. The Air Resources Board approved the staff findings and also found that, due to the importance of particulate matter air pollution and its



impact on the health of Californians, staff should work to present recommendations to the Board for revising the particulate matter standards by Spring 2002, ahead of the deadline set by the Legislature.

### **1.) Tier 1 Criteria Air Pollutants**

The first tier included the pollutants particulate matter with a mean aerometric diameter of 10 microns or less (PM<sub>10</sub>), sulfates, ozone, and nitrogen dioxide. The AAQS for these pollutants will be re-evaluated first. The standard for PM<sub>10</sub> was found to have the highest priority for revision. California also has a separate standard for sulfates but since this class of pollutants represented a subset of particulate matter, staff recommended that the sulfate standard be reviewed in conjunction with PM<sub>10</sub>. Recent scientific publications suggest that health effects may occur when ambient levels of these pollutants are at or near the current State AAQS.

PM<sub>10</sub> is a heterogeneous mix consisting of both fine particles (PM<sub>2.5</sub> or particles 2.5 microns in diameter or less) and coarse particles (2.5 to 10 microns in diameter). Fine particles result from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces and wood stoves, and agricultural burning. They can also be formed in the atmosphere from gases such as sulfur dioxide, nitrogen dioxide and volatile organic compounds. Coarse particles generally emanate from sources such as windblown dust, unpaved roads, materials handling, and crushing and grinding operations. The PM<sub>10</sub> standard is often exceeded throughout the State. Numerous studies indicate that hospital admissions and death from cardiovascular and pulmonary disorders track with the level of PM<sub>10</sub> in the ambient air. This association has been noted in dozens of studies conducted in many cities both in California, the United States, and other countries. The focused review suggests several factors that may render children and infants more susceptible to PM<sub>10</sub>, including a greater amount of time spent outdoors, greater activity levels and breathing rates, higher doses per body weight and lung surface area, and potential irreversible effects on children's developing lungs. A large body of epidemiological studies indicates an association between current ambient concentrations of PM<sub>10</sub> and a suite of adverse outcomes including changes in lung function, respiratory symptoms, asthma exacerbation, doctor visits, emergency room visits, hospital admissions, and premature mortality. The more severe outcomes are experienced primarily by the elderly and by people with pre-existing chronic heart or lung disease. However, several epidemiological studies suggest that children under age 5, and possibly under age 1, may also experience adverse responses from exposure to PM<sub>10</sub>. Studies have found association between PM<sub>10</sub> and changes in lung function, asthma, respiratory symptoms, doctor visits, and premature mortality in this subgroup. A threshold concentration, below which no effects are observed, has not been demonstrated for these outcomes. The precise particle size(s) and biologically active constituents within PM<sub>10</sub> are uncertain. Therefore, the review of the PM<sub>10</sub> standard, which was assigned a high priority, examined the effects of subspecies such as fine and coarse particles. The focused review of the scientific literature on PM<sub>10</sub> indicated that adverse health effects resulting from exposure to ambient PM<sub>10</sub> could occur when

ambient concentrations are near or below the current State standards of 30  $\mu\text{g}/\text{m}^3$  (annual average) and 50  $\mu\text{g}/\text{m}^3$  (24-hour average). The particulate matter standards are under review. A November 30, 2001 review draft document describes findings from an exhaustive review of the literature, and makes health-based recommendations for particulate matter AAQS to the ARB. Considerations include whether to split PM into coarse and fine fractions resulting in separate standards for PM<sub>10</sub> and PM<sub>2.5</sub>, and whether a separate standard is necessary for sulfates, which are also particles and have been studied separately for adverse health effects.

Ozone is the second criteria air pollutant that will undergo extensive evaluation for revision of the AAQS. Ozone is an important component of smog formed by the interaction of sunlight, nitrogen oxides and hydrocarbons in the air. It is an eye and respiratory irritant and has been associated in a number of studies with exacerbation of asthma, decreased lung function measured in both children and adults, and possibly impacts on lung function and development in children.

The review of the scientific literature on ozone indicates the potential for biologically significant effects when exposure concentrations are at or below the State's 1-hr average of 0.09 ppm. The review suggests several factors that may render children and young adolescents more susceptible to ozone effects, including activity and exposure patterns, higher doses per unit of body weight and lung surface area, and the potential for effects on lung growth and development. Controlled exposure studies, which have mainly been conducted with adult subjects, indicate that multi-hour ozone exposures at concentrations as low as 0.08 ppm have resulted in significant transient decreases in lung function, increases in respiratory symptoms and airway responsiveness, as well as cellular and biochemical evidence of airway injury and inflammation. Epidemiological studies suggest effects on lung function, asthma exacerbations, increased use of hospital emergency departments, and other indicators of acute respiratory morbidity in adults and children at ozone concentrations lower than 0.09 ppm. Several recent studies also suggest potential long-term effects on lung function related to cumulative lifetime exposure to ozone, although how these findings may relate to daily average exposures is unknown. A large fraction of California's population resides in areas in which ozone concentrations occur at or above the current State standard, primarily during daylight hours in the summer. Based on a considered assessment of these factors, the ozone ambient air quality standard was prioritized to the first tier of review.

The third criteria air pollutant that will be reviewed is nitrogen dioxide (NO<sub>2</sub>). Nitrogen dioxide is formed during combustion of automotive fuel and other materials. Nitrogen dioxide has been shown to exacerbate asthma and irritate the respiratory tract and eyes. Controlled exposure studies of human volunteers generally fail to show effects of exposure to NO<sub>2</sub> at or below the current California standard of 0.25 ppm. However, recent studies suggest that exposure to NO<sub>2</sub> at concentrations only slightly above 0.25 ppm enhances bronchial or airway responses to challenge with common aeroallergens in subjects with allergic asthma. Nitrogen dioxide exposure could therefore render asthmatics more susceptible to effects from other environmental exposures.

Epidemiological studies have reported relationships between both outdoor and indoor NO<sub>2</sub> concentrations and a variety of adverse health outcomes, including decrements in lung function, increased risks of respiratory symptoms and illness, exacerbation of asthma, especially in children, and increased risks of daily mortality. However, in many of the epidemiological studies an independent role of NO<sub>2</sub> cannot be determined, because of high covariation between NO<sub>2</sub> and other pollutants, or because the investigators did not adjust for the effects of important confounders (especially different measures of particulate matter), or both. Nitrogen dioxide may represent a marker for exposure to traffic emissions generally or to combustion-related pollution, or may play an etiologic role in the observed health effects. Though recent trends suggest nearly complete statewide compliance with the current California NO<sub>2</sub> ambient air quality standard, the results of some of the recent clinical and epidemiological studies suggest that examination of the basis for the standard is warranted. Based on our consideration of the relevant evidence, notably the potential impacts on childhood asthma, the NO<sub>2</sub> standard was allocated to the first tier of pollutants to be reviewed.

## **2.) Tier 2 Criteria Air Pollutants**

The second tier of pollutants included lead, carbon monoxide, hydrogen sulfide, and sulfur dioxide. Exposure to lead has significant effects on the development of children's nervous systems, including impacts on intelligence and behavior. The scientific literature indicates that exposure to an airborne lead level at the current State standard would not be protective of the health of infants and children, and lead is currently listed pursuant to Health and Safety Code section 39657 as a Toxic Air Contaminant (TAC) with no safe threshold. However, exposures to levels of concern occur in a relatively small segment of the population since the statewide average lead level is well below the ambient air quality standard. Since there are few areas of the State where ambient lead is a concern, and since it will be regulated through the TAC control program, the review of the ambient air quality standard for lead was considered a low priority and it was not placed into the first tier.

There is little recent published literature relevant to the ambient air quality standard for hydrogen sulfide (H<sub>2</sub>S) of 30 ppb (1-hr average). Although at high concentrations, H<sub>2</sub>S is an asphyxiant and has been associated with industrial fatalities, its principal effects at ambient levels are odor annoyance, sometimes accompanied by symptoms of headache and nausea. The ambient standard was originally set in 1969 to protect against odor annoyance, based on a small study of adults' H<sub>2</sub>S odor perception thresholds. A report prepared for the ARB in 1985 indicated that at the level of the current ambient standard approximately 40% of adults would be likely to be annoyed by the odor of H<sub>2</sub>S. Young adults and children are likely to be more sensitive with respect to the odor perception and annoyance than older adults. In light of recent guidance from the American Thoracic Society (Samet et al. 2000), such annoyance should be considered an adverse effect from exposure to air pollution. The H<sub>2</sub>S standard was allocated to the second tier because there is little exposure in California and because the health impacts related to low-level exposures to H<sub>2</sub>S are not as serious as those identified for the other criteria

pollutants. Nevertheless, consideration should be given to revising the ambient standard at some future date.

There are several State standards for carbon monoxide (CO), including 20 ppm for one hour, 9 ppm for eight hours, and 6 ppm for eight hours in the Lake Tahoe basin. The standards for CO are based on the critical endpoint of exacerbation of pre-existing coronary artery disease (CAD) among susceptible individuals. Justification of this standard rests upon a substantial body of peer-reviewed literature, and in particular on several controlled human exposure studies. Review and analysis of the current scientific literature on CO indicates that a reasonable margin of safety for the current ambient air quality standard continues to exist in terms of protection against exacerbation of CAD among susceptible adults. Other health endpoints, including fetotoxic effects as well as adult mortality and hospitalization for cardiovascular disease, have been associated with ambient CO in epidemiological analyses. However, considerable uncertainties exist in these studies due to potential confounders and the large exposure measurement error related to use of fixed site monitors for CO. Based on the above findings, there is only weak evidence that the current California ambient CO standards may not be protective against adverse effects of infants, children or other potentially susceptible populations. Therefore, review of the carbon monoxide standard for possible revision was given a lower level of priority.

California has two AAQs for sulfur dioxide (SO<sub>2</sub>), which are intended to protect different sets of potentially susceptible subpopulations. The short-term standard (0.25 ppm, 1-hr average) is based on the results of controlled exposure studies, and is intended to protect exercising asthmatics against effects of acute exposure. The longer-term standard (0.04 ppm, 24-hr average) is based on the results of epidemiological studies, and is intended to protect not only asthmatics, but also individuals at risk for exacerbation of other chronic lung or heart diseases, as well as children and the elderly. Many asthmatic subjects exposed briefly in controlled settings to low levels of SO<sub>2</sub> have demonstrated increased respiratory symptoms such as shortness of breath, coughing and wheezing, and decrements in lung function. By virtue of their activity patterns and generally greater ventilation rates, children may receive greater exposures to SO<sub>2</sub> than adults; therefore active asthmatic children may represent a particularly susceptible subgroup. There is evidence that some non-asthmatic individuals with allergies and airway hyper-responsiveness may also be susceptible to bronchoconstriction induced by short-term exposure to SO<sub>2</sub>. Controlled exposure studies suggest consistent effects (changes in lung function and increased lower respiratory symptoms) in vigorously exercising asthmatics at exposure concentrations of 0.40 ppm and above. Changes in airway caliber unaccompanied by any symptoms have been observed at concentrations of 0.10 to 0.25 ppm in studies using mouthpiece exposures, a method of SO<sub>2</sub> administration that bypasses normal anatomic defenses. Epidemiological studies have examined a variety of outcomes in relation to ambient SO<sub>2</sub> concentrations, specifically daily mortality, increases in hospital admissions for cardiac and respiratory causes, asthma exacerbations, decrements in children's lung function, and increased risks for other respiratory symptoms and illness. In many epidemiological studies that purport to show an SO<sub>2</sub> effect, there is substantial covariation of SO<sub>2</sub> with ambient particles or other

pollutants, so that an independent effect of SO<sub>2</sub> cannot be identified. However, several studies appear to demonstrate associations of adverse health outcomes with ambient SO<sub>2</sub> levels, when measured ambient concentrations were near the current 24-hour California standard. Based on these findings, there is some evidence that the current California ambient SO<sub>2</sub> standards may not protect against adverse effects in the most susceptible populations. Coupled with the evidence that SO<sub>2</sub> levels in California are generally very low, these standards were assigned to the second tier for review.

### **3.) *Revision of PM<sub>10</sub> and Sulfate Standards***

The State of California recognizes that particulate matter (PM) air pollution is a significant public health concern. Numerous scientific studies have shown an association between exposure to particulate matter in the air and adverse health effects primarily on the heart and lung. These adverse health effects range from exacerbation of asthma, hospital admissions for cardiovascular and respiratory diseases, to death from cardiovascular and pulmonary failure. The evidence also indicates that the current levels of the national standards, as well as the more stringent California standards for PM<sub>10</sub>, do not adequately protect public health.

In order to address these issues at the state level, the ARB staff, in consultation with OEHHA staff, is reviewing the California PM<sub>10</sub> and sulfate standards. The OEHHA reviewed the epidemiological and toxicological studies of particulate matter and provided a summary of the information. In addition, the OEHHA provided a draft health-based recommendation for short-term and long-term standards for particulate matter. The ARB and OEHHA prepared a draft staff report entitled "Review of the California Ambient Air Quality Standards for Particulate Matter and Sulfates" dated November 30, 2001 which was released for public review. The staff report contains recommendations for more stringent PM<sub>10</sub> standards as well as establishing new fine particulate standards for particulate matter with an aerometric diameter of 2.5 microns or less (PM<sub>2.5</sub>). The staff report also recommends maintaining the sulfate standard and incorporating an adequate margin of safety. Public workshops were held in December 2001 at various locations in the State.

### **3. *Planned Activities for the Next Two Years***

#### **a. *PM Standards Review***

The ARB, in consultation with OEHHA, will complete its evaluation of the PM and sulfate standards. The AQAC will meet in January 2002 and provide their peer review of the staff report and submit written findings on the draft report. Those findings, along with other comments received from the review process, will be addressed and incorporated into a final staff report. The final staff report will contain the staff's final recommendations for revising the PM and sulfate standards and will be released to the public at the end of March 2002. Staff recommendations will be presented to ARB in May 2002 with the goal of adopting revised standards. The schedule for PM standards review can be found on the internet at: [www.arb.ca.gov/research/aqgs/std-rs/std-rs.htm](http://www.arb.ca.gov/research/aqgs/std-rs/std-rs.htm).

**b. Next Criteria Air Pollutant Review**

Air Resources Board and OEHHA staff will soon begin evaluating the next highest priority criteria air pollutant in order to review and revise the ambient air quality standard. The next highest priority pollutant is ozone. Legislation (HSC 39606(d)) requires revision of the next standard by December 31, 2003.

**4. Program Benefits to Children's Environmental Health**

Ambient air quality standards define "clean air", and are established with the intent to protect the health of even the most sensitive individuals in our communities. Evaluating the adequacy of AAQS to protect infants and children will assure that an adequate margin of safety is applied for the most sensitive subset of the general population.

**5. Recommendations**

The ARB and OEHHA recommend continuing the review of the ambient air quality standards on the schedule identified in the Health and Safety Code.

## **B. Evaluating the Adequacy of California's Air Quality Monitoring Network**

### **1. Community Air Monitoring Studies: Outdoors**

#### **a. Purpose and Requirements of the Legislation**

Purpose: The overall goal of this element of the California Children's Environmental Health Protection Program (the Program) is to evaluate and improve the data available to estimate children's exposures to air pollutants. Insufficient information on the exposures of infants and children poses a significant challenge to assessing the health impacts of air pollution on this vulnerable population. To accomplish this goal, Chapter 731, Statutes of 1999 (Senate Bill 25) requires the Air Resources Board (ARB) to evaluate the adequacy of its ambient air monitoring quality network in its ability to provide information on infants' and children's exposures to air pollution. The ARB is also required to make recommendations to improve the network and data collection in a report due January 2003. This effort will support a major objective of the Program, which is "to ensure that the state's air quality standards and airborne toxic control measures adequately protect the health of infants and children."

Children can sometimes be more at risk than adults from harmful health effects of air pollution because they breathe faster, tend to spend more time outdoors, and engage in higher intensity activities than do adults. The occurrence, nature and severity of air-pollution related health effects that children experience are dependent on how much of a given pollutant they breathe, which in turn is dependent on the level of a pollutant in the outdoor and indoor air. Although pollution levels tend to be similar throughout a region, there may be pockets of higher pollutant concentrations located in close to proximity to pollution sources such as heavily traveled freeways and industrial facilities. Harmful exposures can occur when children live in homes, attend schools, and play at recreational areas located downwind of these sources.

California's extensive ambient air quality monitoring network was designed to measure regional levels of pollutant concentrations in the air. Its primary purpose is for determining which areas of the State are in attainment or in non-attainment with the health-based State and Federal air quality standards for criteria pollutants such as ozone, particulate matter, oxides of nitrogen, oxides of sulfur and carbon monoxide. The network provides information to help determine what air pollution control programs and strategies are needed, and to evaluate the success of our air pollution reduction programs. In addition, there are monitors that support the identification of toxic air contaminants (TACs) in the air and help evaluate locations in the State where there are high toxic levels. There are also many special purpose monitors throughout the State established to support specific programs. The ambient air-monitoring network has been a useful and necessary tool for assessing the regional level of air pollution in California. However it may not adequately represent the localized environments where children spend most of their time.

Legislative Requirements for Outdoor and Indoor Monitoring To enhance our understanding of infants' and children's exposures to air pollution, and the health effects associated with those exposures, SB25 added SEC. 4. Section 39617.5 to the Health and Safety Code.

### **1.) Outdoor Monitoring Studies**

#### **a.) Current Air Quality Monitoring Network Evaluation**

By no later than January 1, 2003, the ARB is to:

- Evaluate the adequacy of the current outdoor air quality monitoring network for its ability to gather the data necessary to determine the exposure of infants and children to air pollutants including criteria air pollutants and toxic air contaminants.
- Identify areas where the exposure of infants and children to air pollutants is not adequately measured by the current monitoring network.
- Recommend changes to improve air pollution monitoring networks and data collection to more accurately reflect the exposure of infants and children to air pollutants.

#### **b.) Expansion of the Network in Six Communities**

For the purpose of sampling air pollution in locations where children spend time, the ARB, in cooperation with local air quality districts is to expand its existing monitoring program in six communities around the state in non-attainment areas. This expansion is to include:

- Special monitoring of children's exposures to air pollutants and toxic air contaminants.
- Placement of air pollution monitors near schools, daycare centers, and outdoor recreational facilities that are in close proximity to, or downwind from, major industrial sources of air pollutants and toxic air contaminants, including, freeways and major traffic areas.
- Monitoring during multiple seasons and at multiple locations within each community at schools, daycare centers, recreational facilities, and other locations where children spend most of their time.
- ◆ A combination of approaches to provide the most comprehensive data possible on the levels of children's exposure to air pollutants and toxic air contaminants. These approaches include:
  - Upgrades to existing fixed monitoring sites.
  - Establishment of new fixed monitoring sites.
  - Conducting indoor and outdoor sampling and personal exposure measurements in each community.



The legislation also stipulates that data collected from expanded air quality monitoring activities may be used for any purpose, if the monitoring devices used to collect the data meet Federal and State regulations pertaining to pollutant measurement methods. In the following sections, the implementation of this element of the legislative requirements is discussed.

## **b. Accomplishments as of January 1, 2002**

### **1.) *Community Selection Process***

There are many communities in California that might have been good choices for the expansion of the network to look at children's exposures to air pollution. In order to meet the requirement to expand the monitoring network, the ARB worked closely with the local air pollution control districts and community groups to identify possible communities that would enhance our understanding of children's exposure.

#### **a.) *Criteria Used in Community Selection***

The ARB selected the six communities using a two-step process. The first step consisted of a general evaluation of communities that might be considered as candidates for selection. Using available information in ARB's data system, we evaluated locations in the State where mobile and industrial sources were concentrated and where the emissions of those sources might pose a risk for children living or playing downwind. A set of criteria were developed to help guide us in our efforts. These included:

- Communities suggested by local air districts, citizens, and environmental groups
- Proximity to existing monitoring sites for air toxics and special monitoring studies
- Potential for coordination with planned or ongoing health studies
- How representative a community was of regional exposure
- Overall air quality of the region and community

Once potential communities were selected, ARB staff used a second set of criteria to make the final selection of specific communities and possible monitoring sites:

- Location of schools and commercial day care centers
- Proximity of major industrial sources and high-risk facilities
- Proximity of freeways or major traffic areas
- Review of data from other databases, such as business permits and air quality data

#### **b.) *Public Input to Selection Process***

The criteria developed for site selection were presented in public workshops in Sacramento, Oakland, Fresno, and Los Angeles. The purpose of these workshops was to receive comments on the draft criteria from members of the public. Written

comments were also received from community groups, air districts, and local and state government officials from both northern and southern California communities. General concerns were raised, such as elevated concentrations of particulate matter and ozone experienced by some communities, as well as specific issues, such as diesel emissions from trucks on specific roadways, general motor vehicle emissions from heavily used freeways, and aircraft emissions from local airports. Other comments focused on emissions from petrochemical refineries, chemical plants, and other major industrial sources which were also of concern. All written and oral comments were considered before final site selection.

### ***c.) Communities Selected***

The six areas chosen exemplify the diversity of weather, geography and air pollution sources present in California where emissions from diesel exhaust, automobiles, neighborhood sources, refineries and marine sources can affect air quality. The following are the six communities chosen: Barrio Logan (San Diego); Boyle Heights (Los Angeles); Wilmington (Los Angeles); Fruitvale (Oakland); Crockett; and Fresno.

Once the communities were selected, ARB worked with the local air pollution districts and community members to select specific locations within the communities for the monitors. All the sites were at or near schools. Each monitoring site will have a primary monitoring location, and most will also have satellite locations around the community. The central air monitoring station at each site will measure a comprehensive suite of air pollutants. They include what are referred to as criteria pollutants, for which the ARB or U.S.EPA have identified harmful above a specific level. These include carbon monoxide, ozone, oxides of nitrogen, sulfur dioxide, particulate matter smaller than 10 microns (PM10), and particulate matter smaller than 2.5 microns (PM2.5). Some sites near refineries will be equipped with hydrogen sulfide analyzers. Measurements are stored as either as hourly or 24 hour average values. Each central site will be equipped with meteorological sensors that will record wind speed, wind direction, relative humidity, barometric pressure and ambient temperature.

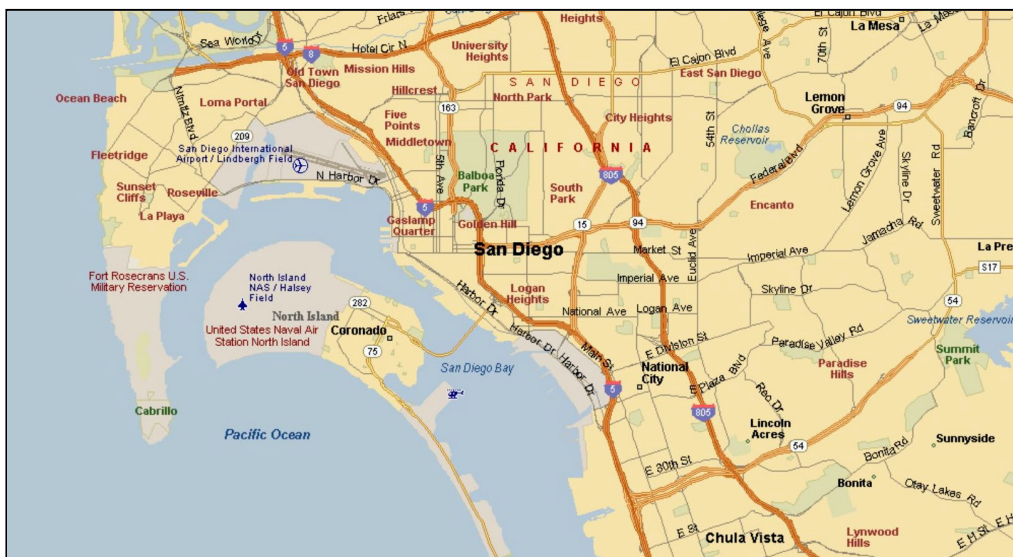
Non-criteria pollutant measurements will also be included at the central monitoring sites and at the more focused satellite sites. Analyzers will be selected to match the pollutants expected to be present in the community. Some non-criteria pollutants can act as indicators of a specific emission activity or category of emission source. These parameters include total non-methane hydrocarbons, elemental and organic carbon, black carbon, and particulate matter compounds. These can be associated with motor vehicles, certain industries, or diesel emissions. Others non-criteria pollutants, such as toxic air contaminants, are associated with specific health risks. The communities and monitoring sites are described below: regardless of the concentration. Toxic gases and metals included in the monitoring include known carcinogens such as 1,3-butadiene, benzene, formaldehyde, and hexavalent chromium.

Although the ARB is the lead agency for carrying out Children's Environmental Health Protection Program monitoring and has overall responsibility for the study, the Bay

Area Air Quality Management District and the South Coast Air Quality Management District will assist with the monitoring. ARB staff will conduct quality control and quality assurance activities.

### 1.) Barrio Logan

Barrio Logan is a small community located in San Diego near the shipyards and the Coronado Bridge. The community was selected for air monitoring because it is located in a large urban area, near major freeways and industrial sources, as well as neighborhood sources such as gas stations, dry cleaners, and automotive repair facilities. Other major sources identified include chrome plating and refinishing operations. Barrio Logan is also the first case study community for the Neighborhood Assessment Program, which utilizes monitoring, emission inventory and modeling results to develop strategies for assessing air quality at a neighborhood scale.



The monitor was installed at Memorial Academy Charter School located at 2850 Logan Avenue, in an area bounded to the north and east by State Routes 94 and 15, respectively, and to the west by Interstate 5. The neighborhood is southeast of the entrance to the Coronado Bridge. The results from monitoring at Memorial Academy will be used to assess differences between air toxic concentrations detected in Barrio Logan and those detected at air monitoring sites in the communities of Chula Vista and El Cajon.

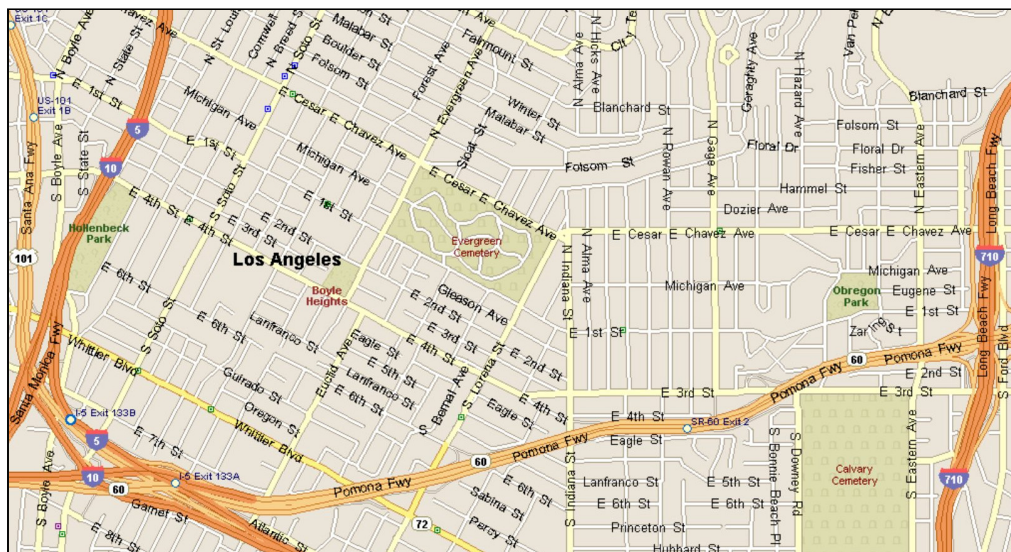
Two additional short-term studies are being conducted to identify potential 'hot spot' locations near pollutant sources. The second phase monitoring will take place near two chrome platers in Barrio Logan.

The first phase of ambient air quality monitoring at Memorial Academy Charter School occurred between October, 1999 and March 2001. The second phase, which consists of more localized monitoring, will take place in the fall of 2001.

## 2.) Boyle Heights

Boyle Heights is located in central Los Angeles County, southeast of downtown Los Angeles. Four major freeways, Interstates 5 and 10 and Highways 60 and 101, border the community. The Boyle Heights community was chosen because of its proximity to mobile source emissions and because of the high number of children living in the community. In addition, major sources identified include printing and auto refinishing facilities, trucking operations, large-scale boilers, and textile facilities. Other sources of air pollution in Boyle Heights include neighborhood scale sources such as dry cleaners and service stations.

The monitor was set up at Hollenbeck Middle School, which is located at 2510 East 6th Street in the residential area of Boyle Heights, and is approximately one-half mile downwind of the convergence of four major Los Angeles area freeways. Hollenbeck Middle School has a student population of 2200. Theodore Roosevelt Senior High School, located directly across from Hollenbeck, is one of the largest high schools in Los Angeles County with an enrollment of over 5000. There are approximately 16 schools and childcare centers (public and private) in the area.



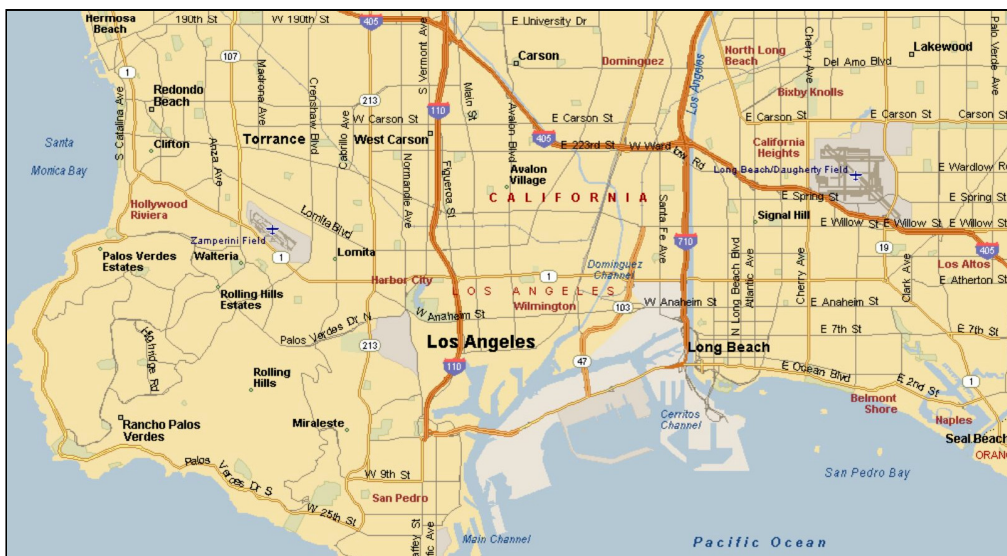
Additional monitoring will be conducted at two other locations within the Boyle Heights community to better assess the impact of vehicular emissions on children in an area a short distance from the freeway. The locations of these secondary, or "satellite," sites will be at or very near other schools in the area. The satellite site locations are the East Los Angeles Mathematics, Science, and Technology Center located at 961 Euclid Avenue and the Soto Street Elementary School located at 1020 South Soto Street. The primary focus of monitoring at both satellite sites will be to estimate the concentration of diesel particulate emissions.

Monitoring at Hollenbeck Middle School began in March 2001, and will run for one year. The satellite sites ran from March 2001 through the end of October 2001.

### 3.) Wilmington

The Wilmington community is located in the southern part of Los Angeles County near the Ports of Los Angeles and Long Beach. It is also the second site selected for the Neighborhood Assessment Program. At the Neighborhood Assessment Program sites we do a more detailed emission inventory and modeling analysis in addition to the monitoring. Wilmington was chosen because of the proximity of high-risk facilities to schools in the community. Wilmington is home to multiple oil refineries with a combined refining capacity of over 250,000 barrels per day. Wilmington is also situated near the ports of Los Angeles and Long Beach, which are sources of diesel and fugitive emissions from bulk transport activities. Other sources of air pollution in Wilmington include neighborhood-scale sources such as dry cleaners, chrome plating operations, and service stations.

Monitoring is being conducted at Mahar House, a Los Angeles-based charitable organization, which is located at 1113 Mahar Avenue. Mahar House is across the street from the Wilmington Park Elementary School and the Wilmington Children's Center located at 1115 Mahar. The number of children attending Wilmington Park Elementary and Wilmington Park Children's Center, is approximately 1400. There are an estimated 12 other schools and childcare facilities in the area.



Additional monitoring will be conducted at a secondary site, located at Hawaiian Elementary School (540 Hawaiian Avenue). Primary focus of the monitoring at this satellite site is to obtain more information about the concentration of diesel particulate emissions from the freeways located to the west of the site and from the port activities located to the south.

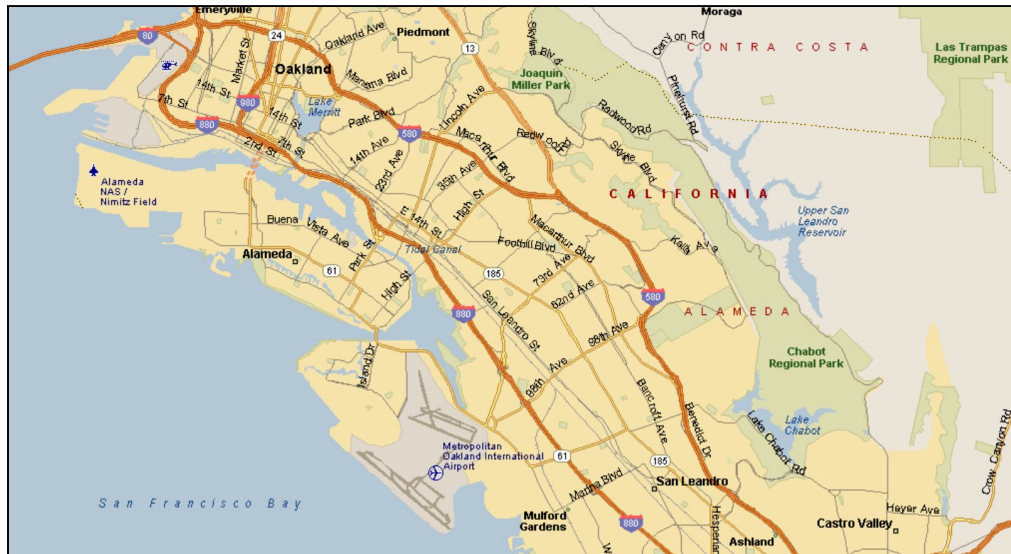
Ambient air quality monitoring began in May 2001 and will run for approximately one year.



#### 4.) Fruitvale

The Fruitvale community is located in Oakland near Fruitvale Avenue and International Boulevard. It was chosen because it is impacted by several categories of pollutant emissions and because of the high school-age population in the area. This community lies between two major East Bay Area freeways that are a significant source of vehicular emissions. It is also less than five miles from the Oakland International Airport, a source of aircraft and ground-vehicle emissions, and it is situated near a major medical waste incinerator that are sources of criteria pollutant and air toxic emissions, including potential sources of dioxin. Other sources of emissions in the community include neighborhood scale sources such as dry cleaners and service stations.

Lockwood Elementary was selected as the primary monitoring site. The school is located at 6701 International Boulevard (East 14<sup>th</sup> Street) and is part of an educational complex that includes Havenscourt Middle School and a child development center. Lockwood Elementary has a student population of nearly 1000. Havenscourt Middle School and the child development center have a combined enrollment of over 800. The educational complex is situated between the 580 and 880 freeways, and near the Oakland Coliseum. It is adjacent to heavily traveled surface streets, and is also downwind of several industrial facilities located near the Oakland Estuary. There are an additional 20 public schools in the Fruitvale area between High Street and 98<sup>th</sup> Avenue.



Additional monitoring at other locations within the Fruitvale community is being considered. The locations of these secondary, or "satellite sites," are under evaluation by the ARB.

Ambient air monitoring at Lockwood Elementary School began in November 2001 and will run for one year. Dioxin monitoring will be conducted for two years commencing January 2002.

### 5.)      Crockett

The city of Crockett is located in northern Contra Costa County where the Carquinez Bridge (Interstate 80) crosses the Carquinez Strait. Crockett was chosen because of its proximity to industrial and mobile source emissions. Oil refineries and major oil storage facilities are located in the nearby cities of Rodeo, Hercules, Martinez, and Benicia. Crockett is situated downwind of several of the refineries under the dominant wind flow patterns in the area. Crockett is also the location of a major food processing operation and a heavy-rail transfer facility. Sulfur dioxide air quality levels in Crockett are among the highest in the Bay Area. Also, the levels of some important air toxics monitored at the Vallejo site across the Carquinez Straits are high in comparison with other sites in the San Francisco Bay Area.

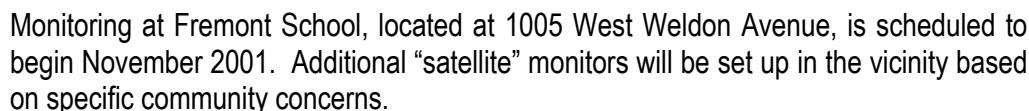
The monitors will be located at John Swett High School. The high school is located at 1098 Pomona Street. The student population of John Swett High School is approximately 650. Carquinez Middle School, located directly across Pomona Street from the high school, has a student population of 500. The schools are located approximately one-half mile downwind of Interstate 80, a major source of vehicle emissions.

Additional monitoring is being considered at other locations within Crockett/Contra Costa County.

Monitoring began in October 2001 and will run for one year.

### 6.)      Fresno

Fresno was chosen as a monitoring site because of its location in the California Central Valley and its proximity to a heavily used highway. Also Fresno is part of an ongoing monitoring program associated with the Fresno Asthmatic Children's Environment Study (FACES). The FACES program is tracking over 300 asthmatic children to determine the impact of air pollution on the disease.



Nine sites will begin sampling for dioxin, furans, and dioxin-like PCBs in the ambient air for a two-year period beginning early 2002. This will be the first time ambient dioxin monitoring has been conducted on a network scale for any length of time in urban areas in the United States. Despite dioxin's extreme toxicity, most monitoring has focused on rural areas and how dioxin may enter the food chain. The monitoring results will be useful for a variety of purposes including addressing the concerns of the Children's Environmental Health Protection Program. Sampling for dioxins, etc., will occur at four of the CEHP sites (Crockett, Fruitvale, Wilmington, Boyle Heights) as well as sites in Livermore, Reseda, Riverside, San Jose, and Richmond.

Several other partnerships exist with the Children's Environmental Health Protection air monitoring program that enhance the usefulness of the data collected by the cooperating programs. Researchers from the Southern California Particle Center and Supersite (SCPCS) are conducting ambient air measurements at several CEHP sites that will be used in conjunction with on-site health studies. The mission of this research-based group is "...to identify and conduct the highest priority research for airborne particulate matter (PM) to ensure protection of the public health."

The CEHP site in Fresno is closely allied with several other major monitoring and health studies. The first is a large ARB funded study of school-aged children with asthma. The combination of information from the CEHP with the Fresno Asthmatic Children's Environment Study (FACES) will greatly expand our understanding about factors that contribute to the progression of asthma, and help define the type of monitoring that is needed to protect children afflicted with respiratory problems.



Secondly, the CEHP site in Fresno is situated just a short distance from an intense air monitoring and health study platform site operated and funded by the US EPA (Fresno 1<sup>st</sup> Street). The Fresno Supersite, as it is called, will provide a rich database that will be a part of the analyses needing to be done under the auspices of the CEHP. This site serves as the central monitoring site for FACES.

### **3.) *Community Meetings***

ARB staff conducted a community meeting at each school as its air monitoring site was brought on line. To date, meetings have been held in all of the communities except Fresno, for which meetings will be held in early 2002. Invitations were sent home with the students to notify the parents of the meeting. Articles were placed in local papers to inform the broader community about the meeting, the Children's Environmental Health Protection Program, and the related monitoring efforts. Invitations were also sent to local community organizations, business groups, local government agencies, and local elected officials. The meetings began with a short presentation by ARB staff and were followed by opportunities for comments and questions from the public. Specifically the ARB staff was looking for input from the community on where to place the satellite monitors. Follow-up community meetings are planned as the air monitoring results become available. Additional community and school meetings will be held to address the indoor study.

### **4.) *School District/ARB Relationship***

ARB staff has been working closely with local school districts as well as the principals and teachers of the schools housing the ARB monitors. Assistance from these school officials was essential for the success of the program, and in return for their cooperation the ARB has offered an air pollution education program that includes tours of the monitoring trailer housing the equipment. Thus far, educational presentations have been made at Theodore Roosevelt Senior High School and Hollenbeck Middle School in Boyle Heights and during an annual community fall festival in Crockett. Additional educational presentations at other school sites have been planned as a collaboration among ARB's Education Office, Monitoring and Laboratory Division, and Planning and Technical Support Division.

### **5.) *Providing Information Back to the Community***

A primary objective of this element of the Program is to provide useful information about local air quality to the citizens of each community. ARB has committed to provide air quality data back as soon as possible to the public. After the ARB, working with the local air pollution districts, have reviewed and summarized the data, the information will be posted on the ARB website ([www.arb.ca.gov](http://www.arb.ca.gov)). In addition, staff have been and will continue to attend community meetings at the schools and other locations to discuss what we have learned with community members and the schools.

**c. Planned Activities for the Next Two Years**

ARB's monitoring efforts, in support of the Children's Environmental Health Protection Program, will be completed at the end of 2002. Because data will be analyzed throughout the monitoring study, we will have already begun to answer the questions concerning the adequacy of the network, and we will be providing information to the community about the air quality over the duration of the project. In addition to looking at the information provided by these special study monitors, we will also be looking at the data from the regional networks and other information gathered by local air pollution districts and other agencies. We plan to use all the information available to make a determination on what recommendations are needed. The assessment of the adequacy of the monitoring network for the purposes of characterizing infants' and children's exposure and the recommendations for improvements will be provided in a final report in January 2003.

**d. Program Benefits to Children's Environmental Health**

The additional information being gathered through ARB's monitoring efforts is critical for evaluation of the existing air quality monitoring network's adequacy for assessing children's exposures. It will enhance our understanding of how well the measurements made at existing sites within a community relate to specific locations where children spend time. It will also add valuable data on pollutants that can serve as markers of exposures related to specific pollutant sources, such as major roadways. This additional data will provide guidance on whether certain measurements need to be strategically added to the existing monitoring network. The insights provided by the monitoring efforts, described above, will be used to guide public health policy that relates to assessing children's exposures to air pollution, and to mitigating those exposures.

**e. Recommendations**

The recommendations arising from this element of the Program will be published in January 2003 after all the data have been collected and fully evaluated.

**2. Community Air Monitoring Studies: Indoors****a. The Children's Microenvironmental and Personal Exposure Study**

Indoor and personal exposure monitoring are required under SB 25 to provide more comprehensive data required to define the levels of children's exposure to air pollutants and to facilitate an assessment of the adequacy of the monitoring network in estimating those exposures. Children's exposure to air pollutants inside classrooms will be measured during the 2001-2002 school year in three of the selected SB 25 communities.

**b. Accomplishments as of January 1, 2002**

The ARB has contracted with Dr. Steven Colome of the University of California, Los Angeles to measure pollutants inside school classrooms, at one location on the school grounds, and in

a few residences. These measurements will be taken at Hollenbeck Middle School in Boyle Heights, Wilmington Park Elementary School in Wilmington, and one northern California school. Pollutants to be measured include toxic gases, particulate matter, and formaldehyde and related compounds. A subset of students will wear small monitoring badges to measure their personal exposure to toxic gases in a 48-hour period. The contractor will also administer a health status survey to students in the monitored classrooms to determine the prevalence of asthma and allergies. Additionally, to meet objectives of the ARB's Neighborhood Assessment Program, information on ways to reduce exposures to indoor and outdoor contaminants will be developed and distributed.

The study started during fall 2001 and field measurements are scheduled for completion by the end of the school year in June 2002. Approximately one-third of the monitoring will be completed by January 2002. An interim report of preliminary findings from the first two seasons of fieldwork will be prepared in May 2002, with the final report on the entire project due in March 2003.

The study results will provide valuable information that will help the ARB identify differences between pollutant levels measured at network monitoring sites and children's indoor and personal exposures to air pollutants. The personal monitoring data will provide insight to children's actual exposures to toxic air pollutants. The microenvironmental monitoring data collected at locations where children spend most of their time - at school and home - will expand our knowledge of how indoor sources contribute to children's exposures. Finally, this information will be useful in identifying additional pollutant sources that may require emission reductions in the future.

## **C. Review of Toxic Air Contaminants**

### **1. List of Toxic Air Contaminants of Concern**

#### **a. Purpose and Requirements of the Legislation**

Senate Bill 25 added a new section to the Toxic Air Contaminant Program established in the Health and Safety Code (Chapter 3.5, section 39650 et seq.) with special provisions for children. In these provisions, the Office of Environmental Health Hazard Assessment is required to develop a list (the List) of up to five toxic air contaminants (TACs) that may cause infants and children to be especially susceptible to illness. The Air Resources Board must then review affected airborne toxic control measures for TACs on the List within two years (by July 2003) to ensure they adequately protect infants and children. If there are no existing control measures for a TAC on the List, the ARB must prepare a needs assessment and adopt appropriate control measures within three years (by July 2004). Beginning July 1, 2004, and annually thereafter, the OEHHA is required to evaluate 15 TACs and provide threshold and non-threshold exposure levels, and update the List. Once the List is updated, the ARB must then again review any existing control measures and prepare a needs assessment and adopt appropriate control measures for up to five TACs. The specific requirements and actions taken by OEHHA and the ARB to implement these provisions of Senate Bill 25 are discussed in more detail below.

#### **b. Accomplishments as of January 1, 2002**

##### **1.) Prioritization of the Toxic Air Contaminants**

The OEHHA conducted preliminary assessments of all identified TACs (includes about 200 chemicals or chemical classes). Using information on health effects, ambient air concentrations, and emissions sources, 36 TACs were identified and prioritized for focused literature searches. The review of the literature evaluated information on the potential for differential impacts on infants and children as compared to adults.

In evaluating the information obtained during the focused literature reviews for each of the 36 TACs in order to decide whether the TAC merited consideration for placement on the first list of five TACs (step 6 above), we used the following criteria as a guide:

- a.) Any evidence indicating that infants and children may be more susceptible than adults to the toxicological effects associated with that TAC. The strength of this evidence was weighted heavily in the initial selection of 17 TACs that disproportionately impact children.
- b.) The nature and severity of effect(s), especially if they are irreversible.
- c.) Any evidence indicating that, based on current risk assessment methodology, the existing health criteria may not be adequately protective of infants and children.
- d.) Any potential difference in susceptibility of infants and children (relative to adults) to carcinogenesis based on known information or plausible mechanisms.

- e.) Extent of exposure and/or the magnitude of risk estimated to occur at concentrations typical of California urban ambient air, and any indication that infants and children may experience greater exposures to materials contaminated by airborne particles (e.g., house dust).

Because children undergo more rapid rates of development than adults, the expectation is that chemicals that affect the nervous system, respiratory system, immune system, endocrine and reproductive organs, and exhibit developmental toxicity would impact children more than adults. Thus, those TACs that are neurotoxins, endocrine disruptors, immunotoxins, respiratory system toxicants, and developmental toxicants were of most concern.

Exacerbation of asthma is included as a toxicological endpoint of particular concern to children. Asthma surveillance data developed by the national Centers for Disease Control and Prevention (CDC) and reports on asthma hospitalization by the California Department of Health Services (CDHS, 2000) both indicate that children, especially young children, are impacted by asthma morbidity more than adolescents and adults. The statistics for prevalence rates indicate that a significantly higher percentage of children have asthma than adults. Children are more susceptible to respiratory irritants because they have smaller airways than adults. The constriction of the airway and secretion of fluid into the airway that occurs during an asthma attack greatly increase airflow resistance in a small child relative to an adult. Thus, breathing difficulty is very significant in young children experiencing an asthma attack. The hospitalization rate for newborns and children to 4 years of age is greater than all other age groupings, and is four-fold higher for black children than for white children. Therefore, TACs that exacerbate or induce asthma will be considered for listing under the Children's Environmental Health Protection Act.

## **2.) Tiered Process for Proposed Listing of TACs**

Five TACs were listed under Health and Safety Code Section 39669.5(a) as possibly causing infants and children to be especially susceptible to illness. These are: Polycyclic organic matter or polycyclic aromatic hydrocarbons, lead, polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) (collectively identified as "dioxins"), particulate emissions from diesel-fueled engines, and acrolein. Polycyclic aromatic hydrocarbons (PAHs) were chosen because of evidence of developmental toxicity and increased susceptibility to genotoxicity (including carcinogenicity) in young animals and humans. These effects can have irreversible consequences. Exposure to PAHs is widespread, as these chemicals are products of incomplete combustion and are ubiquitous in the environment. Lead was chosen because it is a developmental neurotoxin. The increased susceptibility of infants and children is well established and the neurological effects are extremely prolonged. In addition, lead is a carcinogen. Although airborne lead exposures have dropped due to removal of lead from gasoline, airborne lead exposures still occur as a result of stationary source emissions and re-entrainment of soil contaminated with lead. In addition, deposition of airborne lead onto soil, vegetation, and other surfaces can result in exposure via ingestion. Polychlorinated

dibenzo-p-dioxins (dioxins) and dibenzofurans (furans) were chosen for listing under SB 25 because of developmental toxicity, effects on the immune system, endocrine systems, and carcinogenicity. Infants and children appear to be more susceptible to these effects which may result in irreversible changes. Like PAHs, dioxins and furans are also relatively ubiquitous because they are products of incomplete combustion and persist in the environment. For acrolein, indoor and outdoor exposures are believed to be high, although data on typical ambient air concentrations are limited. Nonetheless, this compound exacerbates asthma and therefore was placed in Tier 1. Diesel exhaust particulate is ubiquitous in urban environments, and exposures are as widespread as the use of diesel engines with little or no emissions controls. There are many studies demonstrating that diesel exhaust particulate can enhance allergic responses, and induce new allergies to airborne allergens. This raises concern for enhancement of allergic airway disease including asthma, and potentially for development of new asthma. Diesel exhaust particles contribute to ambient PM<sub>10</sub> (particulate material with a mean aerodynamic diameter of 10 micrometers). Ambient PM<sub>10</sub> has been shown to exacerbate asthma and has been associated with low birth weight and decreased lung function in children. Several studies provide evidence of adverse respiratory health impacts in children living near streets with heavy truck traffic. In addition, diesel exhaust particulate contains PAHs (and other mutagenic polycyclic organic matter). As noted above, PAHs can induce developmental toxicity and there is evidence that the fetus is more sensitive than the adult to genotoxicity of PAHs. Thus diesel exhaust particulate was chosen for listing.

There were four meetings of the Scientific Review Panel at which the List of TACs was discussed. Transcripts are available on the ARB web-site ([www.arb.ca.gov](http://www.arb.ca.gov)). The final technical support document (Prioritization of Toxic Air Contaminants under the Children's Environmental Health Protection Act) discusses the five chemicals (or class of chemicals) that constitute the initial list of TACs that may cause infants and children to be especially susceptible to illness. The document also discusses a second list of TACs for which there are concerns about impacts on infants and children. It is important to stress that some of the other TACs not listed also pose a threat to infants' and children's health and need to be evaluated in future updates of the List; however, the List was limited to five TACs (individual chemicals and categories of compounds) by July 1, 2001.

### **c. Planned Activities for the Next 2 Years**

#### **1.) Update the list**

The list of TACs that may cause infants and children to be more susceptible to illness will be updated periodically. The OEHHA is required to update the list by July 1, 2005, although it may be updated sooner. The OEHHA is not constrained to listing only five during the updates.

## **2.) Evaluate additional TACs and risk assessments for adequacy in protecting children**

In addition to developing a list of TACs that may differentially impact infants and children, OEHHA is also required to evaluate 15 TACs and their health criteria (cancer potency estimates and estimates of non-cancer health effects levels, called Reference Exposure Levels (REL)) for their adequacy in protecting children. While the statute requires OEHHA to evaluate infants and children specifically, it is important to note that existing risk assessment methodologies use protective assumptions to protect children when evaluating and quantifying risk from exposure to chemicals. These assumptions include use of the 95% Upper Confidence Limit of the slope of the dose-response curve (in other words, a high-end estimate) when evaluating cancer potency and use of an uncertainty factor of 10 for interindividual variability in the human population when developing noncancer REL (in other words, we assume that there is a 10-fold variability in response to toxic chemicals in the human population). Risk assessors have always known that such assumptions are crude but data have generally been lacking to use anything other than such assumptions for most chemicals. As part of the long-term goals of SB 25, OEHHA will be evaluating available information to assess the adequacy of these assumptions in protecting infants and children from toxic air contaminants. These evaluations will be used to modify our risk assessment methods where appropriate and necessary to ensure adequate protection of infants and children. The OEHHA will be conducting an in-depth analysis of information in the literature that might help us determine whether our existing risk assessment methods are adequate over the next three fiscal years. By July 1, 2004, we plan to have assessed our existing methods and developed any necessary changes to those methods. This requires both public comment and peer review. An evaluation of available cancer risk assessment guidelines for their adequacy in protecting children has already been conducted (see Section II.).

### **d. Program Benefits to Children's Environmental Health**

The question of whether current standards and criteria are adequately protecting infants and children from chemical toxicants in the air has been posed for some time. Recent developments and advancements in science are beginning to provide answers to this question. The implementation of the statutory requirements of SB 25, such as the continuing evaluation of toxic air contaminants, will bring to the forefront information relevant to answering whether existing State or federal health criteria are adequate to protect infants and children. As TACs are added to the list of chemicals that may differentially impact infants and children, the ARB will be evaluating any control measures for adequacy and developing new ones where they do not now exist. Over the long term, revised standards and effective control measures should better protect infants and children from environmental contaminants.

### **e. Recommendations**

Continued support of this program is recommended in order to provide the technical and health information needed by regulatory agencies to better protect infants and children from toxic air pollutants.

## **2. Air Toxics Control Measures**

### **a. Purpose and Requirements of the Legislation**

The goal of the air toxics program is to reduce to the maximum extent feasible, or eliminate when possible, exposure to toxic air pollutants to all Californians, including infants and children. Senate Bill 25 requires the ARB to review and revise within two years any control measure adopted for the TACs on the List established by OEHHA (due July 2003). For any TAC on the List for which there are no existing control measures, the law requires the ARB to prepare a needs assessment report and adopt control measures, as appropriate, within three years (July 2004). The five TACs included on the List for which these actions must be taken are: acrolein, particulate matter from diesel-fueled engines (Diesel PM), dioxins, lead, and polycyclic organic matter (POM).

### **b. Accomplishments as of January 1, 2002**

Of the five TACs listed by OEHHA as making children especially susceptible to illness, the ARB has airborne toxic control measures (ATCMs) for two that must be reviewed by July 2003. These two measures were developed to reduce emissions of dioxins and lead.

- Airborne Toxic Control Measure (ATCM) for Dioxins from Medical Waste Incinerators: This ATCM requires the control of dioxin emissions from medical waste incinerators burning more than 25 tons per year, by 99 percent, or to emit dioxins at a rate less than 10 nanograms per kilogram of waste. Operators must also conduct two consecutive annual source tests. Smaller facilities, depending on the amount of waste burned, are subject to source test and record-keeping and operator training requirements. Adopted by ARB: July 1990.
- Airborne Toxic Control Measure for Toxic Metals from Non-Ferrous Metal Melting: This ATCM requires certain non-ferrous metal melting facilities to reduce emissions of toxic metals, including lead, arsenic, cadmium and nickel. Operators must also comply with a fugitive emissions limit by implementing a dust control plan and complying with a visible emissions limit of less than 10 percent opacity. Specified exemptions are offered to small and low-emitting facilities. Adopted by ARB: January 1993.

### **c. Planned Activities Over the Next Two Years**

The ARB has begun the review of these control measures. The projected milestones for the review process are shown below:

- |                                     |                         |
|-------------------------------------|-------------------------|
| ▪ Public Workshop                   | Spring 2002             |
| ▪ Release report of review findings | Fall/Winter 2002        |
| ▪ Advise Board of findings          | Winter 2002/Spring 2003 |

If it is found that a regulatory change is needed to either of the existing ATCMs, the above schedule would be modified to include additional workshops, with a final Board hearing to adopt proposed revisions to the ATCM in the Spring or Summer of 2003.



For those TACs identified by OEHHA for which there are no existing control measures, the ARB is required to prepare a needs assessment report and adopt control measures, as appropriate, by July 2004. Health and Safety Code section 39665 has specific requirements for issues to be addressed, to the extent that data is available, in a needs assessment report. Specifically, the report must address:

- (1) The rate and extent of present and anticipated future emissions, the estimated levels of human exposure, and the risks associated with those levels.
- (2) The stability, persistence, transformation products, dispersion potential, and other physical and chemical characteristics of the substance when present in the ambient air.
- (3) The categories, numbers, and relative contribution of present or anticipated sources of the substance, including mobile, industrial, agricultural, and natural sources.
- (4) The availability and technological feasibility of airborne toxic control measures to reduce or eliminate emissions, the anticipated effect of airborne toxic control measures on levels of exposure, and the degree to which proposed airborne toxic control measures are compatible with, or applicable to, recent technological improvements or other actions which emitting sources have implemented or taken in the recent past to reduce emissions.
- (5) The approximate cost of each airborne toxic control measure, the magnitude of risks posed by the substances as reflected by the amount of emissions from the source or category of sources, and the reduction in risk which can be attributed to each airborne toxic control measure.
- (6) The availability, suitability, and relative efficacy of substitute compounds of a less hazardous nature.
- (7) The potential adverse health, safety, or environmental impacts that may occur as a result of implementation of an airborne toxic control measure.

The TACs for which this requirement is applicable are particulate matter from diesel-fueled engines (diesel PM), acrolein, and polycyclic organic matter. The ARB staff has also decided to update the existing needs assessment reports that were developed for the dioxin and lead control measures to include recent emissions information and to determine if additional emission reductions are appropriate. Discussed below are projected milestones for the development of the needs assessment and appropriate control measures by substance.

**Acrolein** is present in motor vehicle exhaust, tobacco smoke, wood smoke and some industrial emissions, and is used as an herbicide in irrigation canals. It can also be formed in the atmosphere from chemical reactions involving 1,3-butadiene, another pollutant present in motor vehicle and industrial emissions. The projected milestones for the development of a needs assessment report for acrolein are:

- |                                  |            |
|----------------------------------|------------|
| ▪ Begin Work on Needs Assessment | Late 2001  |
| ▪ Draft Needs Assessment         | Late 2002  |
| ▪ Decision on ATCM Development   | Late 2002  |
| ▪ Propose ATCM, if needed        | Early 2003 |
| ▪ Adopt ATCM, if proposed        | Mid 2004   |

**Diesel PM**, emitted as particulate matter from diesel-fueled engines, consists of microscopic particles present in diesel exhaust. Diesel PM was identified as a TAC in 1998 and the ARB adopted a needs assessment report in September 2000, entitled the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (the Diesel Risk Reduction Plan). The Diesel Risk Reduction Plan outlines control measures to be developed over the next 10 years to reduce diesel PM emissions by 75%. In October 2001, the ARB adopted new on-road diesel-fueled engine standards for heavy-duty vehicles. The control measures planned to go before the Board for consideration in the next two years are:

- Solid Waste Collection Vehicles
- Fuel Delivery Cargo Tankers
- Publicly Owned and Contracted On-Road Vehicles
- Stationary Diesel Engines
- Portable Diesel Engines
- Marine Vessels

Six additional control measures for the control of diesel PM will be developed prior to 2010.

**“Dioxins”** includes two families of extremely toxic chemicals: polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). Dioxins typically are released to the air during incineration of wastes, combustion of fuels to produce power for industrial purposes, and motor vehicle use. The ARB developed a needs assessment and adopted a control measure for dioxins in 1990. Pursuant to the requirements of Senate Bill 25, the existing control measure affecting dioxin emissions is undergoing review (see above). Currently, the ARB is undertaking a comprehensive air quality monitoring and testing program to collect ambient data for dioxins, furans, and dioxin-like polychlorinated biphenyls (PCBs) in California. This “dioxin” monitoring and testing program is scheduled to last through 2003. The data will be used to update the needs assessment report and identify additional control measures if necessary.

**Lead** is a toxic metal that occurs naturally in the earth's crust. It exists in combination with organic and inorganic compounds. Lead compounds are used in a variety of sources, including construction materials, electronic devices, ammunition, batteries, and in certain ceramics and plastics. Airborne lead levels have decreased dramatically in recent decades, primarily due to the ban on leaded gasoline. Inorganic lead was identified as a toxic air contaminant in 1997. In 2001, the ARB also released the *Risk Management Guidelines for New, Modified and Existing Sources of Lead*. The ARB adopted a control measure to reduce toxic metal emissions from metal melting operations in 1993, which reduced lead emissions, along with a variety of other toxic metals. Pursuant to the requirements of Senate Bill 25, the existing control measure is now undergoing review (see above). The needs assessment prepared for that control measure was done for a variety of toxic metals. Therefore, the ARB is going to prepare a needs assessment report specific for lead as part of the Senate Bill 25 requirements. The projected milestones for the development of a needs assessment for lead are:

- |                                  |            |
|----------------------------------|------------|
| ▪ Begin Work on Needs Assessment | Late 2001  |
| ▪ Draft Needs Assessment         | Late 2002  |
| ▪ Decision on ATCM Development   | Late 2002  |
| ▪ Propose ATCM, if needed        | Early 2003 |
| ▪ Adopt ATCM, if proposed        | Mid 2004   |

**Polycyclic Organic Matter (POM)** consists of a family of more than 100 chemicals containing more than one benzene ring and a boiling point of greater than 100°C. POM can be divided into the subgroups of polycyclic aromatic hydrocarbons (PAHs) and PAH-derivatives. They are produced by the combustion of fossil fuels, vegetable matter and other carbon-based materials. POM is present in exhaust from diesel- and gasoline-powered motor vehicles, fireplace smoke, tobacco smoke, and emissions from paper mills, industrial machinery manufacturing plants, and petroleum refineries. The projected milestones for the development of a needs assessment report for POM are:

- |                                  |            |
|----------------------------------|------------|
| ▪ Begin Work on Needs Assessment | Late 2001  |
| ▪ Draft Needs Assessment         | Late 2002  |
| ▪ Decision on ATCM Development   | Late 2002  |
| ▪ Propose ATCM, if needed        | Early 2003 |
| ▪ Adopt ATCM, if proposed        | Mid 2004   |

#### **d. Program Benefits to Children's Environmental Health**

The benefit of the review and adoption of airborne toxic control measures is reduced exposure to toxic air contaminants that adversely impact children. Airborne toxic control measures are adopted based on reducing the level of emissions to the lowest level achievable through the application of best available control technology (BACT) or a more effective method. The review of existing control measures will assure that BACT, or the most effective method, is being required in light of the development of new technologies. For TACs where no control measures exist, the actions outlined above will put regulations in place, if appropriate, for reducing emissions of the TACs that make infants and children susceptible to illness.

#### **e. Recommendations**

Continued support of this program is recommended because it provides new information to regulatory agencies and better protects infants and children from exposures to air pollutants. When the needs assessments show additional control measures that can be taken to further reduce exposures, adoption of those measures is recommended.



## ***II. Governor's Children's Environmental Health Initiative (AB 2872)***

### **A. Cancer Risk Assessment for Children**

#### ***1. Purpose of Legislation and Legislative Requirements***

The purpose of this legislation was to direct the OEHHA to review existing state and federal cancer risk assessment guidelines for adequacy in addressing carcinogenic exposures to the fetus, infants, and children, and to develop, finalize, and publish children's cancer guidelines that are protective of children's health.

##### **a. Review cancer risk assessment guidelines**

OEHHA is required to review cancer risk assessment guidelines (HSC § 901 (b) ) for use by the office and the other entities within the California Environmental Protection Agency (Cal/EPA) to establish cancer potency values or numerical health guidance values that adequately address carcinogenic exposures to the fetus, infants, and children. (Due June 30, 2001). OEHHA is required to review existing state and federal cancer risk guidelines, as well as new information on carcinogenesis, and shall consider the extent to which those guidelines address risks from exposures occurring early in life (HSC § 901 (c)). (Due June 30, 2001)

##### **b. Develop criteria for carcinogens, assess methods, publish guidelines**

HSC § 901 (d)(1) requires OEHHA to develop criteria for identifying carcinogens likely to have greater impact if exposures occur early in life. (Due June 30, 2004). OEHHA is also required to assess methodologies used in existing guidelines to address early-in-life exposures (HSC § 901 (d)(2)) (Due June 30, 2004). In addition, OEHHA is required to construct a database of animal studies to evaluate increases in risks from short-term early-in-life exposures (HSC § 901 (d)(3)) (Due June 30, 2004). And, finally OEHHA is required to finalize and publish children's cancer guidelines that shall be protective of children's health (HSC § 901 (e)). (Due June 30, 2004)

#### ***2. Accomplishments as of January 1, 2002***

OEHHA staff completed the review of existing federal and state cancer risk guidelines, including the California Department of Health Services' *"Guidelines for Chemical Carcinogen Risk Assessments and Their Scientific Rationale, November 1985,"* the U.S. Environmental Protection Agency's (U.S. EPA) *"Guidelines for Carcinogenic Risk Assessment, 1986,"* the U.S. EPA's *"Proposed Guidelines for Carcinogenic Risk Assessment, April 1996,"* and the U.S. EPA's July 1999 preliminary draft document *"Guidelines for Carcinogen Risk Assessment."* The extent to which any of these guidelines addresses exposures early in life is extremely limited, with the exception of the U.S. EPA's July 1999 draft revised guidelines. While children are generally recognized as a potential sensitive population, no guidance on quantitative approaches to the assessment of risk to children or infants is provided, again, with the exception of the U.S. EPA's July 1999 draft revised guidelines. The July 1999 draft revised guidelines address the need for

dose adjustments (from adults to children) when estimating cancer risks from children's exposures by certain routes, but do not provide guidance on age-dependent adjustments for differential responses of individuals exposed early in life. The July 1999 draft revised guidelines are currently under revision by the U.S. EPA. The U.S. EPA's revised (July 1999) guidelines document also includes examples of case-studies illustrating how risks from early-in-life exposures to specific chemicals may be assessed.

An initial version of the criteria for determining carcinogens that might have greater impact if exposure occurs early in life has been developed. The criteria are based on review and evaluation of data from human and animal studies demonstrating that exposures early in life can cause increased incidence of cancer compared to exposures during adulthood. OEHHA's preliminary criteria will be refined and expanded as analyses of the relevant literature and scientific data continue.

Current federal and state cancer guidelines used to estimate excess cancer risk do not use methodologies (mathematical models) that address early-in-life exposures. This methodological "gap" may underestimate lifetime risks when exposures occur early in life rather than over a lifetime of exposure. There is a need for such methodologies to be developed, tested, and validated.

Two databases have been constructed to evaluate increases in risks from early-in-life exposures. The first database was developed within OEHHA, and is intended to facilitate the analysis of studies of carcinogens administered to animals during different periods of life. Over 850 individual studies have been identified that potentially provide adequate data for comparison of cancer risk following administration of carcinogenic agents at different time periods, e.g., prenatal and perinatal, childhood, and adulthood. Because of the large number of potential studies that address early life exposures, OEHHA's efforts to enter information into this database initially focused on specific chemical classes and studies of mechanisms of carcinogenic action.

The second database was developed under a contract with the University of Massachusetts. This database compiles all studies where a single dose of a chemical was tested to determine if it could cause tumors in animals. This database allows each study to be evaluated for a large number of parameters that may affect tumorigenesis. The database currently contains approximately 5,500 studies involving about 800 chemicals from 2,000 scientific journal articles. The database will facilitate the analysis of studies in which animals of different ages (e.g., newborn, six-week old, one-year old) received a single administration of a particular carcinogen, and tumorigenic outcome was assessed.

### **3. *Planned Activities for the Next Two Years***

Efforts are currently underway to assess and characterize the effect of different carcinogens on early-in-life exposures on lifetime excess cancer risk. These efforts are central to the development of the children's cancer guidelines. The children's cancer guidelines are scheduled to be completed by July 1, 2004.

A large body of scientific literature needs to be evaluated, compiled, and analyzed to ensure that the children's cancer guidelines reflect the most current scientific knowledge regarding the effect of age of exposure on lifetime cancer risk. Specific activities include:

- Continue to review the scientific literature on studies of cancer resulting from exposures during different stages of life.
- Continue to review and evaluate relevant studies comparing effects of exposures to cancer-causing chemicals early and later in life, extract salient data, and incorporate these into databases.
- Analyze and construct biostatistical models of age-dependent effects of carcinogens, extracting key information from the two databases developed by or for OEHHA.
- Draft guidelines for chemical carcinogenic risk assessment that incorporate project findings and statistical models that take into account the fetus, infants, and children.
- Continue to develop guidance and new methodologies related to specific aspects of children's cancer risk.
- Continue to evaluate toxicity criteria and standards for regulated carcinogens, with the goal of ensuring that children are adequately protected.

#### ***4. Program Benefits to Children's Environmental Health***

Using a systematic and disciplined approach, early-in-life exposures to specific classes of chemicals can be addressed. Although uncertainty persists among the public and scientific community regarding the extent and nature of the effects from early-in-life chemical exposures, it is not unreasonable to expect that their study could address, and possibly answer questions about fundamental mechanisms of carcinogenesis. The guidelines will allow better assessment of risks from early-in-life exposures and better inform risk management decisions that affect the fetus, infants and children.

#### ***5. Recommendations***

Continued support of this aspect of the children's health initiative is key to developing better standards that will be protective of infants and children.

## **B. Contaminants of Greatest Potential Health Concern at Schools**

### **1. Purpose and Requirements of Legislation**

The Office of Environmental Health Hazard Assessment (OEHHA) is charged with identifying chemicals found at schools that may be of particular concern to children under AB 2872 (HSC § 901).

On or before January 1, 2002, the office, in consultation with the appropriate entities within the California Environmental Protection Agency, shall identify those chemical contaminants commonly found at school sites and determined to be of greatest concern based on criteria that identify child-specific exposures and child-specific physiological sensitivities. On or before December 31, 2002, and annually thereafter, the office shall publish numerical values for five of those chemical contaminants. These two mandates are discussed below.

### **2. Accomplishments as of January 1, 2002**

#### **a. Identifying Contaminants of Concern**

Health and Safety Code § 901(g) stipulates that OEHHA, by January 1, 2002, will identify those chemical contaminants that are commonly found at school sites; and determined to be of greatest concern based on criteria that identify child-specific exposures and child-specific physiological sensitivities. In carrying out the mandate, OEHHA has performed a broad review of federal and state programs to identify relevant monitoring data regarding the presence of chemical contaminants at school sites, and literature searches to identify applicable studies concerning child-specific physiological sensitivities of environmental contaminants. While OEHHA did not definitively identify those chemicals that are commonly found at school sites and for which children have unique physiological sensitivities, OEHHA has identified two groups of candidate chemicals that make up reasonable boundaries regarding the likelihood of them occurring at school sites (comprising approximately 200 chemicals), and their potential for causing adverse effects on school-age children (approximately 190 chemicals). The creation of these compilations of chemicals now will facilitate the development of numerical health based criteria discussed in the next section. It is imperative that this program moves forward so that high priority chemicals can be identified, and that numerical health criteria can be developed expeditiously for application in school-site risk assessment. The lead time required for developing health-based criteria certainly argues for working from these candidate chemicals, rather than waiting to complete a definitive list of chemical contaminants that are found at school sites and determined to be of greatest concern based on child-specific physiological sensitivities.

The first compilation of chemicals, which defines the boundaries of what are likely to be found at school sites, is based on the following inclusive criteria:

- All pertinent sources and environmental media affecting the school setting should be considered.



- Chemicals, which have been targeted by federal and state agencies for monitoring in the pertinent environmental media (air, water, soil) and are likely to be found at school sites, should be considered.

Using these criteria, OEHHA considers the following as candidate contaminants that are likely to be found at school sites:

- Eighty-six soil contaminants that have been reported in school site Preliminary Endangerment Assessments and reviewed by Department of Toxic Substances Control (DTSC). These soil contaminants are found at potential school sites and are likely to be found at existing school sites.
- Eighty-seven Toxic Air Contaminants (TACs) that were emitted to, or detected in, California's ambient air. They are used as a proxy to represent potential contaminants that may be found in the outdoor air at schools.
- Sixty potential classroom contaminants targeted for monitoring by Department of Health Services (DHS) and Air Resources Board (ARB), as part of their Portable Classroom Program.
- Forty-seven toxic chemicals targeted by U. S. Environmental Protection Agency (USEPA) in its National Human Exposure Assessment Survey (NHEXAS) and twenty-six contaminants targeted by USEPA in its Total Exposure Assessment Methodology (TEAM) studies because of their persistence in the environment. These chemicals are deemed likely to be found in various environmental compartments at schools, as well as their surrounding communities.

These candidate contaminants do not add up to 200 as indicated because there are a fair amount of overlaps among the chemicals reported or targeted by the above federal and state agencies.

The second compilation of chemicals, which outlines the boundaries for chemicals with potential child-specific sensitivities, is based on the following criteria:

- Have one or more citations in the scientific literature (as indexed by National Library of Medicine's online database and Pub Med) when searched for chemically-induced adverse effects on the nervous, respiratory, reproductive, endocrine, immune system, or chemically-induced cancer during early development and childhood. These organ systems are targeted because they are characterized by having sensitive periods, or critical windows, of cell proliferation, migration, and differentiation during childhood during which chemical insults may produce adverse effects at relatively low doses. These effects may not be recognized until maturity.
- The chemical was identified as a Proposition 65 Developmental and Reproductive Toxin by OEHHA.

As discussed, there are approximately 190 chemicals in the second compilation. Of these, about 75 were identified from the Proposition 65 list of Developmental and Reproductive

Toxicants. Chemicals on the Proposition 65 list that were obviously not likely contaminants at school sites, such as pharmaceuticals, were excluded from the compilation of chemicals.

OEHHA's compilations must be viewed as a living document, which will require additions and subtractions as more data become available to OEHHA in the future. While we have attempted to include all reasonable candidate chemicals in the initial compilations, ongoing literature reviews and results from studies of our sister agencies may turn up additional candidate chemicals. Conversely, the compilations may include some chemicals that ultimately lack sufficient data to conclude that there is a differential effect on children, or may be found not to occur commonly at schools. The working compilations of chemicals will serve to direct data-gathering and in-depth literature review, and to facilitate the prioritization of chemicals for evaluation for health-based criteria development.

### **3. *Planned Activities for the Next Two Years***

#### **a. Refinement of the List**

The compilations of chemicals will be updated as studies become available. OEHHA will also consider additional candidates that DTSC identifies in its upcoming Preliminary Endangerment Assessment (PEA) reviews and that Department of Pesticide Regulation (DPR) identifies from pesticide use notification by school districts pursuant to AB 2260 (Shelly "School Safety" Chapter 718 Statutes of 2000). Furthermore, the compilations will be updated upon the completion of an in-depth evaluation of the priority chemicals discussed in 3.b.

#### **b. Development of numerical health guidance values pursuant to [HSC901(g)]**

AB 2872 (HSC § 901(g)) also stipulates that by December 31, 2002, and annually thereafter, OEHHA develop numerical health-based guidance for five of the chemicals listed under Task 2.a until the list is exhausted. Pursuant to this task, OEHHA will select a subset of chemicals which appear on both of the candidate compilations for further evaluation, to determine if there are sufficient data on critical toxic effects in the organ systems that are developing in children to support the creation of child-specific numerical guidance values based on a non-cancer end-point. To that end, the following selection criteria have been proposed:

- 1.) Chemicals having the strongest indication of being present at school sites.
- 2.) Chemicals with the strongest evidence of possible developmental, neurological, immunological, respiratory, reproductive, or endocrine effects.
- 3.) Where applicable, chemical carcinogens with an existing non-cancer reference dose (RfD) that approximates the dose associated with a  $10^{-4}$  (one in ten thousand) to  $10^{-6}$  (one in a million) cancer risk and that is based on toxicity studies in adult animals.

Criterion 3 helps target those chemicals that would be of greatest concern to OEHHA. If data from recent studies on juvenile animals suggest that child-specific physiological susceptibility exists, these chemicals would pose a significant non-cancer risk as compared to their cancer risk. Criterion 3 helps target those chemicals that would be overlooked because of their

carcinogenic endpoint, but which may also have adverse health effects in children. When the current RfD for adults (where no adverse health effects are anticipated) is similar to the exposure level that equates to an acceptable cancer risk level, it is possible that children may be more susceptible because of their relatively larger exposure dose and thus require further reduction in the “acceptable” exposure level.

Internal reviews, interagency advisory panel, requests for data and/or workshops will be considered as possible mechanisms for collecting input into the prioritization and selection of chemicals for the in-depth review and for developing health criteria based on available data. A minimum of five chemicals will be selected from this prioritization process for the in-depth evaluation for purposes of developing the health-based criteria. In a separate task, OEHHA is developing a cancer evaluation methodology for children pursuant to HSC901(e). Because that methodology will not be available until 2004, initial efforts in Task 2.b are focused on evaluating the non-cancer effects of chemicals. Cancer endpoints will be evaluated when the children’s cancer risk assessment methodology is developed.

#### ***4. Program Benefits to Children’s Environmental Health***

By identifying chemicals of concern to children at school sites, we will better be able to manage exposures to children at school and make better decisions regarding siting of new schools to avoid exposures to toxic chemicals present in the environment.

#### ***5. Recommendations***

Continues support of this key children’s health initiative is critical to ensuring a safer environment at school.

## **C. Children's Environmental Exposure Studies**

### **1. Portable Classroom Study**

#### **a. Purpose and Requirements of the Legislation**

The objectives of the California Portable Classrooms Study are to assess the statewide environmental health conditions in California's portable classrooms and to develop recommendations to remedy or prevent any problems identified. As specified in AB 2872 (Shelley, 2000) and Section 39619.6 of the Health and Safety Code, the ARB and DHS are required to evaluate the school ventilation systems and maintenance practices, assess indoor air quality, and identify any toxic contamination including molds and allergens, in California's classrooms. The ARB and DHS must also submit a final study report, including recommendations, to the Legislature by June 30, 2002. More information can be found at: [www.arb.ca.gov/research/indoor/pcs/pcs.htm](http://www.arb.ca.gov/research/indoor/pcs/pcs.htm).

#### **b. Accomplishments as of January 1, 2002**

To obtain the data needed, the ARB and DHS, in a contracted effort with Research Triangle Institute (RTI), have conducted a mail survey and obtained formaldehyde data from nearly 1,000 schools statewide. This was Phase I of the study. In Phase II of the study, currently underway, RTI is collecting environmental data at two portable classrooms and one traditional classroom in each of 70 schools selected randomly statewide. Investigators are collecting data on formaldehyde and related gases, other gaseous pollutants such as benzene and chloroform, real-time particle counts, molds and allergens, carbon monoxide, temperature, and humidity. RTI also is collecting floor dust samples to be analyzed for toxic metals, pesticides, and other toxic pollutants; distributing brief questionnaires to the teachers and facility managers, and performing an on-site assessment of heating, ventilation, and air conditioning systems.

#### **c. Planned Activities for the Next Two Years**

The ARB and DHS expect to receive a draft report from RTI on the results of the Phase I mail survey January 2002. By then, the main field study will be in full progress, with environmental monitoring expected to be completed by March 2002. The study will conclude with a final report submitted to the Legislature in June 2002, including recommendations developed in consultation with school districts, portable classroom manufacturers, state agencies, and other interested parties. The recommendations will address any unhealthful environmental conditions found in the study and may serve as the basis for actions by school districts, state agencies, or the Legislature to address those conditions.

#### **d. Benefits to Children's Environmental Health**

The California Portable Classrooms Study was funded to provide sound information and recommendations as a basis for actions to address reported environmental problems in

portable classrooms, including formaldehyde, mold, and ventilation problems. The recommendations that result from this study will be used by the Legislature and others to take effective actions that will improve the learning environment in California schools. Most importantly, actions taken will directly benefit children by reducing health impacts from classroom conditions.

**e. Recommendations**

Recommendations for actions needed to improve environmental conditions in portable classrooms will be included in the June 2002 report to the Legislature. Some improvements are currently being implemented as the result of lawsuit settlements and various actions by school districts, such as the Los Angeles Unified School District's self-inspection program for unhealthful school conditions. However, it is anticipated that the study will document reported problems in classrooms, and that further actions will be needed to fully protect children's health.

**2. School Bus Study**

**a. Purpose and Requirements of the Legislation**

A study of pollutant levels in and near school buses is being conducted to improve estimates of children's pollution exposures during school bus commutes. Investigators will measure in-bus and near-bus pollutant concentrations during normal or simulated bus operations across a full range of conditions, activities, and fuels. Conditions will include different roadway types, varying traffic densities, and various ventilation rates during roadway travel and during loading, unloading, and idling periods at bus stops and school sites. Diesel, gasoline, and natural gas-fueled buses will be studied. Several buses retrofitted with diesel particulate traps will also be included.

**b. Accomplishments as of January 1, 2002**

The pilot study for this project is expected to be completed by the end of 2001, with submittal of a pilot study report anticipated in early 2002.

**c. Planned Activities for the Next Two Years**

In the first quarter of 2002, the results of the pilot study will be used to refine the final study plan for the main study. The main field study will be conducted later in 2002, with a final report due by June, 2003.

**d. Benefits to Children's Environmental Health**

Results of the study will be used to quantify children's exposures to air pollution during their school bus commutes and to evaluate the associated health risks. Results will aid in guiding the ARB's (and others') efforts to reduce children's exposure to air pollution, especially their exposure to diesel exhaust particulate matter.

**e. Recommendations**

Recommendations will be developed after completion of the main field study in 2002. Although a number of programs and regulations are currently being implemented by ARB and others to reduce diesel exhaust emissions, further actions may be needed to assure adequate protection of school age children.

## **D. School Site Programs**

### **1. Guidance for Risk Assessment at Schools**

#### **a. Purpose and Requirements of Legislation**

On or before December 31, 2002, the office shall publish a guidance document, for use by DTSC and other state and local environmental and public health agencies to assess exposures and health risks at existing and proposed school sites (HSC § 901).

The mandate for producing guidance for risk assessment at schools is found in Section 901(f)(1) of the California Health and Safety Code. Following the section cited above, 901(f)(1) goes on to state that: "The guidance document shall include, but not be limited to, all of the following:

- 1.) Appropriate child-specific routes of exposure unique to the school environment, in addition to those in existing exposure assessment models.
- 2.) Appropriate available child-specific numerical health effects guidance values and plans for the development of additional child-specific numerical health effects guidance values.
- 3.) The identification of uncertainties in the risk assessment guidance and those actions that should be taken to address those uncertainties."

#### **b. Accomplishments as of January 1, 2002**

The work on the guidelines is still in the planning stages. The project is discussed below.

#### **c. Planned Activities over the Next Two Years**

OEHHA is developing a framework for a multimedia, multipathway, risk assessment (MMRA) within the Cal/EPA. From among the many exposure pathways encompassed by the MMRA framework, those that are relevant to exposures in the school setting will be selected for incorporation into a school exposure scenario. OEHHA will further develop this into a specific model to assess exposures in school. Relevant exposure pathways and scenarios at schools are a subset of the pathways operating in other settings. There are a number of ways children can be directly and indirectly exposed at school to contaminants in soil, including vapors emitted from contaminated soil upon which the buildings are located, which can cause indoor and outdoor inhalation exposures. Children can also be exposed to soil contaminants entrained in wind-blown dust. Contaminated shallow aquifers underneath school property can also release volatile chemicals into the air or leach contaminants to surface soils. The proposed guidance will consider, but not be limited to, exposures that could occur from:

- 1.) Vaporization of volatile materials on or off school sites
- 2.) Transport of vapors from soil into school building interiors
- 3.) Entrainment of soil particles into aerosols

- 4.) Movement of soil particles into school building interiors via transport of aerosols and by tracking of soil particles into building interiors on shoes and other vectors
- 5.) Deposition of particles onto interior surfaces
- 6.) Movement of soil contaminants into or onto produce by rain-splash and root uptake
- 7.) Partitioning of absorbed chemicals into human milk.

The school environment is a unique exposure scenario, which will require an additional set of exposure parameters. For example, building characteristics, and the age structure and activity patterns of the school users may differ from typical occupational or residential settings. OEHHA is evaluating the availability of data to support school-specific exposure parameters. Since it will probably not be possible to develop reliable estimates for all school-specific exposure parameters by December 31, 2002, some parameters may have to be estimated based on extrapolation from other scenarios. OEHHA plans to sponsor focused research to aid in developing school-specific exposure parameters. Some examples of school-specific exposure parameters and data needs follow:

a.) Food ingestion

OEHHA has not identified data concerning the fraction of students' diet from vegetables grown on campus. OEHHA may survey schools to estimate the frequency of gardening on school sites, and consumption of the resulting produce by students. Initial estimates of this parameter will probably be extrapolations from existing data.

b.) Soil or dust ingestion

Soil or dust ingestion by children and adults in the residential setting has been estimated by U.S. EPA. However, there are no estimates specific to the school environment, and no generally accepted method to estimate the fraction of the daily exposure that comes from indoors versus outdoors. Basic research in the area of soil and dust ingestion in the school setting is beyond the scope of this project. Initial estimates will probably be extrapolations from existing data.

c.) Soil or dust dermal contact

Interior dust is a potentially important exposure medium for school site exposure assessment because students typically spend much of their time at school in classrooms and other indoor areas. The fraction of dust that comes from site soil is poorly characterized, but potentially significant. The fraction of total dermal loading contributed by soil versus interior dust is unknown. Data and models are available to estimate dermal loading and dermal uptake, although they are not specific to schools.

d.) Air inhalation and suspended particle inhalation/ingestion

Vapors and contaminants in or on respirable particles may be absorbed through the lung or cleared from the respiratory tract and swallowed. The atmospheric loading of outdoor and indoor suspended particles and the fraction of these particles that come from site soil



are unknown, but significant for purposes of school site evaluation. OEHHA anticipates that data from the ARB/DHS portable classroom study may be useful in estimating this value.

e.) Time spent indoors

The ratio of time spent indoors to time spent outdoors is significant because the indoor environment may differ markedly from the outdoor environment in terms of concentrations of contaminants in air and dust. Survey of schools may be conducted to estimate this parameter.

f.) Water ingestion

Although most school water supplies are from regulated municipal sources, water sources may contain some of the same contaminants as those found on the site, and thus merit consideration as a separate exposure source. OEHHA will attempt to collect data on the frequency of use of on-site wells.

**d. Program Benefits to Children's Environmental Health**

By providing guidelines for conducting risk assessment at school sites, we will be better able to define potential risk of exposures to children at school and make better decisions regarding siting of new schools to avoid exposures to toxic chemicals present in the environment.

**e. Recommendations**

Continued support of this key children's health initiative is imperative.

**2. Evaluating Risks at School Properties**

**a. Purpose and Requirements of the Legislation**

On January 1, 2000, two new laws on school construction became effective: Assembly Bill (AB) 387 Wildman "School Site Contaminants Act", Chapter 992 Statutes of 1999 and Senate Bill (SB) 162 Escutia "School Facilities Act" Chapter 1002 Statutes of 1999, which added Sections 17072.13, 17210, 17210.1, 17213.1 - 17213.3 and amended Sections 17070.50 and 17268 of the Education Code. These statutes require the involvement of the Department of Toxic Substances Control (DTSC) in the environmental review process for the proposed acquisition and/or construction of school properties, including expansions and additions, where state funding is utilized. These new laws address concerns raised by parents, teachers, local communities, and the Legislature over school properties that are or may have been contaminated by hazardous materials and thereby pose a potential health threat to children and staff. Initially, the concerns were focused on several school projects in the Los Angeles Unified School District, including the Belmont Learning Center and Jefferson New Middle School. Discussions were expanded to include all school districts and the apparent lack of any review or oversight of the site investigations by environmental agencies. The new

laws codified the process for environmental review and named DTSC as the lead agency for evaluating school properties.

In addition to the evaluation of the presence of hazardous materials on the proposed school properties, the legislation expanded DTSC's authority to evaluate naturally occurring hazards, such as petroleum deposits and naturally occurring asbestos in serpentine rock formations. DTSC also evaluates other hazards not traditionally considered hazardous materials, such as methane generation from oil fields, former dairy properties, and landfills. All of these considerations have been incorporated into a comprehensive approach developed by DTSC for evaluation, mitigation, and approval of new school sites.

#### **b. Accomplishments as of January 1, 2002**

In response to this legislation, DTSC organized a specific program, the School Property Evaluation and Cleanup Division (Schools Program), to provide the regulatory process for review of school sites. Because of the legislatively mandated review time for different phases of the site investigation, a highly efficient, creative, and dedicated scientific team is assigned to each project. Included in this team are environmental scientists, engineers, geologists, toxicologists, and public participation specialists. The Schools Program has utilized a team approach for expediting review, approval, and remediation of sites. Branches of this program are located in DTSC offices in Sacramento, Glendale, and Cypress.

In order to facilitate the implementation of this new program, the Schools Program and DTSC Human and Ecological Risk Division (HERD) managers have participated in monthly coordination meetings with representatives from the Department of Education (CDE) and the Coalition for Adequate School House (CASH). CASH is a lobby group representing 1,200 school districts, architects, attorneys, construction managers, consultant and facility planners, contractors and developers, and financial institutions. Topics of discussion have included sampling guidance and protocols prepared by DTSC, timeframes and costs for environmental reviews, structure and content of the Environmental Oversight Agreements, pending legislation, and other issues of concern to local school districts. These meetings have resulted in improved coordination, cooperation, and communication between school districts, CDE, and DTSC providing an avenue for school districts to raise their concerns to DTSC. In order to facilitate outreach to school districts, DTSC has participated in over twelve workshops and conferences in both Northern and Southern California, giving presentations on DTSC's site evaluation, risk assessment, and cleanup process. These are briefly described below.

##### **1.) *School Site Review Process***

The school site review process is broken down into three components or steps. These steps follow the previous site evaluation process of the Department of Education (Phase I and Phase II evaluations), with the addition of requirements of the State Superfund legislation and USEPA CERCLA (United States Environmental Protection Agency Comprehensive Environmental Response, Compensation, and Liability Act).

a.) Phase I Assessments

The first step in the environmental oversight of proposed school sites is the historical review of the property in the Phase I Assessment (Phase I). This assessment includes historical information on permits, business, and suspected and known uses of the properties, Sanford maps, and aerial photographs. The Phase I is conducted in accordance with the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM Designation E 1527). The ASTM Standard was supplemented by the DTSC Phase I Environmental Site Assessment Advisory: School Property Evaluation (September 5, 2001) to address additional naturally occurring and anthropogenic sources of hazardous materials. DTSC reviews Phase I assessments within a 30 day timeframe and makes a determination of either 'No Action' or 'Preliminary Environmental Assessment (PEA)' is required. Currently the Schools Program has evaluated over 509 Phase I assessments since this legislation was enacted. Of these Phase I assessments, approximately 60% have required further environmental investigation in the form of a PEA.

b.) Preliminary Environmental Assessment (PEA)

For proposed school sites where known or suspected presence or releases of hazardous materials may have occurred, a Preliminary Environmental Assessment (PEA) is required. This assessment is based on the guidance document: Preliminary Endangerment Assessment (DTSC, 1994, revised 1999). The PEA is a focused-screening site investigation approach that is used for either a 'No Further Action' (NFA) or 'Further Action' determination. An NFA determination means that the school site either has no contamination or that any contamination levels are below a level of health concern. Further Action can require either the collection of additional environmental samples to determine if a problem exists, or a remedial action. The approach in the PEA is designed to maximize the possibility of determining the need for further action while minimizing the actual sampling on the site. DTSC has reviewed 373 PEAs for proposed school properties. Of these PEA evaluations, approximately 30% have required Further Action, which would include either additional environmental sampling or a remedial action. All PEAs are required to go through a thirty-day public notice and comment period, during which time a hearing is held by the local school district. Following this comment period, DTSC makes a final determination of the PEA.

c.) Remedial Actions

DTSC has required remedial actions on a number of proposed school sites in order to ensure a school setting that does not pose a significant health risk to the students and staff. Almost all of the remedial actions required by DTSC have entailed soil removal with the exception of 3 to 4 sites. These exceptions have included soil vapor extraction systems, and mitigation of naturally occurring conditions. DTSC follows the State Superfund process for all remedial actions, which includes the notification, education, and input of the local affected communities. This public participation aspect of the

process encourages the members of the community, the students and parents of the proposed school, and local and regional governmental agencies to provide feedback to DTSC before the final remedial decision is made. DTSC has conducted 8 remedial actions at proposed school sites, and has approximately 20 projects currently pending action.

## **2.) Risk Assessment Approaches for Proposed School Properties**

A screening risk assessment is described in the PEA, which includes use of an unrestricted land use scenario, selection of chemicals of concern, and collection of background samples for inorganic chemicals. In developing the approach for evaluation of school properties, the Human and Ecological Risk Division (HERD) of DTSC has added several additional issues for consideration in risk screening evaluations.

### **a.) Unrestricted Land Use Exposure Scenario**

The PEA uses an unrestricted land use exposure scenario that is equivalent to a residential land use. The assumptions in this exposure scenario are that an individual lives on the site both as a child and as an adult. This screening approach provides an assessment of both exposures to children, assuming exposure parameters of a small child, as well as the long-term exposures to adults and older children. The unrestricted land use scenario has been used for a number of years in DTSC in determining appropriate remediation strategies for sites, as well as the necessity of placing deed restrictions or land use covenants on properties following remediation to prevent use of the property by sensitive populations. Sensitive end use has included residences, schools, day care centers, and hospitals. A school child-specific exposure scenario is being developed by Office of Environmental Health Hazard Assessment (OEHHA) with input from DTSC/HERD and should be completed by the end of 2002. In addition, child-specific toxicity factors will be evaluated for limited number of chemicals by OEHHA starting in 2002 which will eventually be utilized by DTSC in risk assessments for schools. The unrestricted land use scenario has been, and will continue to be utilized by DTSC for decision-making purposes at proposed school sites until the new exposure scenarios and toxicity factors are finalized. DTSC/HERD believe that the screening approach utilized in the initial site investigation and characterization of these properties is warranted and provides a protective and health conservative approach to evaluating risks to children.

### **b.) Chemicals of Concern and Indoor Air**

All detected chemicals at the site are evaluated in the risk assessment, except for metals that occur at or below background concentrations for the site. DTSC does have the authority to evaluate and mitigate naturally occurring conditions that could pose a potential health risk to the students and staff (see below). In addition, soil gas data are collected at sites where known or suspected sources are present and the risk analysis for volatile organic compounds (VOCs) is conducted using an indoor air intrusion model.

- Arsenic concentrations in background soils are particularly problematic, since background levels in many areas are above a screening excess lifetime cancer risk level of one in million ( $1 \times 10^{-6}$ ). Because of this, it is particularly important to determine if the observed arsenic levels on a site are naturally occurring background or if they are from an industrial or anthropogenic source. To help address this issue in the Los Angeles area, where many new schools are being proposed by Los Angeles Unified School District (LAUSD), HERD evaluated data from seventeen proposed LAUSD school sites that had been reviewed and approved by DTSC. From these sites, HERD compiled a data set of over 550 soil samples of arsenic and then conducted a statistical evaluation. The upper tolerance limit (UTL) of the distribution is 8.2 parts per million (ppm) of arsenic. This approach is being used by DTSC to determine whether arsenic is a contaminant on other LAUSD sites and in the development of cleanup goals for LAUSD where arsenic contamination is found. The data are reported in the document: Draft Interim Report on LAUSD Background Metals – Arsenic, Department of Toxic Substances Control, Human and Ecological Risk Division, August 31, 2001. Because of the variability of background arsenic concentrations across the state, the arsenic value generated for Los Angeles may not be applicable; however, the approach used for the LAUSD school sites can be applied to other areas in the state.
- Background metals are generally determined on a site-by-site basis, unless there is a nearby background data set which has been approved by DTSC. The use of regional or statewide values is discouraged because of the potential large range in concentrations. HERD is currently working on a data set, similar to the arsenic study, for the other background metals in the Los Angeles area. DTSC has the authority to require investigation of naturally occurring conditions, such as highly elevated metals or asbestos in serpentine rock, and mitigation of these conditions have been pursued at several proposed school sites.
- Volatile organic compounds (VOCs) are commonly found on sites in urban areas. The source of VOCs can be from leaking underground and aboveground fuel tanks, solvent tanks and sumps, and contaminated groundwater from sources either on or off-site. Evaluation of VOCs is conducted using the Johnson and Ettinger Vapor Intrusion Model approved by USEPA and modified by HERD. This model is a conservative estimate of potential vapor intrusion and concentration in building interiors. VOC contamination can be found in the soil and in groundwater. Both of these potential sources for vapor migration are evaluated as an addendum to the PEA guidance at proposed school sites. Input source concentrations can be used from soil gas, soil matrix, or groundwater data.

### c.) Special Considerations

In addition to the more common types of contaminated sites that DTSC has traditionally been involved with, such as industrial facilities, hazardous waste landfills, and groundwater contamination, the legislation gives DTSC broad authority to investigate other forms of potential exposure to chemicals which could impact the health of children on school sites. Some of these areas include former agricultural properties, former dairy properties, naturally occurring asbestos, buildings with lead-based paint, chlordane application sites, and sites overlying petroleum fields and associated drilling activities.

- Many new schools have been proposed on properties that were formerly used for agricultural purposes. In most cases, these properties had legally-applied pesticides used in the process of crop production. DTSC developed a modified sampling strategy for evaluating properties with uniform pesticide application. This guidance, Interim Guidance for Sampling Agricultural Soils (June 28, 2000), has been used extensively for PEA evaluations. The strategy maximizes the sampling coverage with a cost effective approach utilizing selective composite sampling in crop areas. Focused, discrete sampling is applied in areas of pesticide mixing, loading, storage, or other areas of concern. Approximately 5% of the former agricultural sites have required some remediation of the soil because of pesticide residues. Most of these pesticides were organochlorine pesticides, with elevated levels of toxaphene being the most common pesticide requiring remediation. Arsenic contamination, associated with the use of arsenical pesticides, has also been frequently identified at these sites.
- A number of large, former dairy farms have also been evaluated for proposed school sites. These former dairy properties present a unique environmental challenge because of the large volume of animal wastes disposed of on the sites. In most cases, filled in collection ponds are present containing many feet of animal wastes. These areas produce extremely large amounts of methane. Methane concentrations from soil gas samples have ranged as high as hundreds of thousands of parts per million. Since the lower explosive limit for methane is 50,000 ppm, the potential exists for migration of the methane to the surface creating potentially hazardous conditions. Several proposed and existing school properties have required methane collection systems to address these issues.
- Asbestos, a known human carcinogen, occurs naturally in serpentine rock deposits throughout California. Recent attention has been focused on the Sierra foothill area east of Sacramento. DTSC has approached schools built in these areas with an evaluation of the potential for serpentine outcroppings, grading, and disturbances to disperse asbestos fibers. Asbestos-containing materials used in buildings are not regulated under the DTSC Schools Program, since asbestos in these materials is regulated by a number of federal, state, and local agencies. However, DTSC may require verification that asbestos-containing materials have been properly handled on properties proposed for school construction.

- Lead contamination of soil around residential and commercial buildings that may have been painted with lead-based paint, is a fairly well defined problem requiring a focused investigation. Many proposed school properties do not have any evidence of industrial activity and the only concern is the potential presence of lead contaminated soil from lead-based paint because of the age of structures. Other state and county agencies regulate lead-based paint on building surfaces, and DTSC is not involved with evaluation of these buildings. DTSC is, however, responsible for identification and remediation of potential soil contamination from buildings with lead-based paint. DTSC recently released the Interim Guidance for Evaluating Lead-Based Paint and Asbestos-Containing Materials at Proposed School Sites (July 23, 2001), which details an approach for sampling soils around buildings either before or after building demolition on proposed school sites. This guidance provides a standard sampling approach with a screening evaluation based on the DTSC Lead Spreadsheet Model, Version 7 ("LeadSpread") to determine potential health effects to children and decision criteria for soil removal.
- A number of areas in California, including Los Angeles, San Luis Obispo County, and Kern County, have significant underlying oil fields scattered throughout these areas. Evaluation of proposed schools in these areas may include the assessment of migrating gases (methane and hydrogen sulfide) as well as surface contamination from any former or existing oil wells. HERD is currently developing guidance for investigation of school properties located on petroleum fields.
- Chlordane, an organochlorine pesticide, was injected into or placed on soil surrounding many existing structures over a 30 to 40 year period to control termites. Chlordane was banned in 1980. Until then, it was used by licensed pesticide applicators as well as available to the general public. Because home and property owners had access to chlordane, actual application rates cannot be documented. It currently is not known if chlordane residues present a potentially significant soil contamination problem for properties where buildings are being demolished in preparation for new schools. DTSC is initiating a focused study on select properties to determine if chlordane contaminated soil may be a significantly frequent occurrence. DTSC is expecting completion of this initial study in the spring of 2002.

### **3.) Supplemental Guidance**

Many of the documents cited below can be found on the DTSC web site: [www.dtsc.ca.gov](http://www.dtsc.ca.gov).

#### **a.) Guidance**

- Interim Guidance for Sampling Agricultural Soils, June 28, 2000
- Interim Guidance for Evaluating Lead-Based Paint and Asbestos-Containing Materials at Proposed School Sites, July 23, 2001
- Guidance for Integration of School Sites Requirements and Site Mitigation Program Activities at Military Facilities, October 23, 2001
- Draft Interim Report on LAUSD Background Metals – Arsenic, August 31, 2001

#### **b.) Advisories**

- Phase I Environmental Site Assessment Advisory: School Property Evaluations, September 5, 2001
- Project Manager Advisory: PCBs and Transformers, September 2001
- Information Advisory: Clean Imported Fill Material, October 2001
- Project Manager Advisory: Hydrogen Sulfide, October 2001
- Project Manager Advisory: Methane Gas, October 2001
- Project Manager Advisory: Septic Systems, October 2001

#### **c.) Fact Sheets**

- Fact Sheet #1: New Environmental Requirements for Proposed School Sites, Assembly Bill 387 Wildman "School Site Contaminants Act", Chapter 992 Statutes of 1999 and Senate Bill 162 Escutia "School Facilities Act" Chapter 1002 Statutes of 2000, June 2000
- Fact Sheet #2: Update on Environmental Requirements for Proposed School Sites/Construction Projects, AB 2644 Summary, February 2001
- Fact Sheet #3: Update on School Site Environmental Review Process, AB 972 Summary, November 2001

#### **d.) Guidance in Draft**

- Background Metals at Los Angeles Unified School District Sites
- Draft Guidance on Methane Production on Former Dairy Properties
- Draft Guidance on Evaluation and Mitigation of Radon on Proposed School Sites
- Draft Guidance on Naturally Occurring Asbestos at Proposed School Sites
- Draft Guidance on Petroleum Sites and Total Petroleum Hydrocarbons (TPH)



#### **4.) *Emerging Issues: Existing Schools***

DTSC has been actively involved in school projects since 1995. Over the course of the last several years, a number of issues have become apparent. The first issue was the lack of environmental oversight on selection, characterization, and remediation of new school properties. This problem was addressed in the legislation adopted in 2000. The other major issue has been the increasing awareness of the potential magnitude of the problem of hazardous material contamination on existing school properties. The sources of these problems have varied with the schools, and while they tend to be situated in urban areas, rural and agricultural areas are not exempt from problems. In the past, some schools were built on poorly characterized and/or remediated sites. Additionally, many of these school sites had undocumented fill material brought in during construction. Even when the original school was built on clean property, it is not unusual for commercial and industrial facilities to be located adjacent or near the schools after the schools had been built. A number of existing schools had been located next to landfills or on areas requiring ongoing remediation or monitoring. Finally, it has recently come to DTSC's attention that some schools were built on burn ash waste disposal sites. There are over 8000 schools in California, many of them have existed for decades and most of them are in urban cities. Currently, there is no mechanism for a systematic environmental review of existing schools, unless the school is adding a significant addition that would require state funding. In this case, DTSC oversight would be required under the current statutes. DTSC has investigated a handful of existing schools and remediated the soils at several of these sites. The following are a few examples of the different types of problems that have been encountered at some existing schools.

##### **a.) *Suva Elementary and Intermediate School, Bell Gardens***

Suva Schools were one of the first existing school sites that DTSC investigated. The Elementary School was built in the 1930's and the Intermediate School was added in the 1950's. During the 1960's two chrome plating facilities moved in next to the Elementary School. Concerns over hexavalent chromium emissions from these facilities triggered an investigation by the South Coast Air Quality Management District (SCAQMD) in the late 1980's. The facility next to the school, which had highest levels of releases, was required by SCAQMD to reduce hexavalent chromium emissions. Hexavalent chromium is a known human carcinogen by the inhalation route of exposure. DTSC was requested by Cal/EPA in 1997 to investigate the potential contamination of surface soils on the school site because of community concerns following the revelation of a number of children with cancer. DTSC conducted a PEA and low levels of hexavalent chromium were found primarily near the fence next to the facility and high levels of contamination were found in the soil at the adjacent facility. The soil was removed from the area along the fence, the soil at the facility was covered, and the chrome plating facility elected to cease operations. DTSC is continuing its investigation of two chrome plating facilities, and a probable remedial action will be upcoming for these sites.

***b.) Jefferson New Middle School, Los Angeles***

Construction began on Jefferson New Middle School in the early 1990's. In 1995, DTSC became aware of the school during an investigation of the property across the street from the school. The property had at one time housed a chrome plating operation and the surface soils on and immediately offsite were contaminated with hexavalent chromium. DTSC informed the school district and later became involved in a thorough investigation of the school property. The school was built on property, which had a number of industrial uses, and had known contamination from leaking underground storage tanks, which had contained solvents. Due to lack of thorough investigation, record keeping, and poorly planned remediation system by the school district, DTSC was requested by the community and parents to investigate the school property. Hexavalent chromium was found deep in the soil on one section of the school and an extensive solvent plume was identified. An upgraded and redesigned vapor extraction system was approved by DTSC and will be operational in the near future to address the solvent contamination under and around the buildings. An investigation of the VOC and hexavalent chromium contaminated groundwater is ongoing.

***c.) Burbank Elementary School, San Bernardino***

Burbank Elementary School was built in the 1920's in what was then a largely agricultural area in San Bernardino. During the 1960's, a pesticide application company specializing in treatment of homes and buildings relocated adjacent to the school. When the current pesticide company was conducting an environmental investigation of their property before moving to a new location, it was discovered that organochlorine pesticides, including chlordane, dieldrin, and DDT, had spread to the adjacent grass playground area of the school. DTSC worked with the company and the school district and closed the school for six weeks in the fall of 2000. The soil over most the playground was removed and backfilled with clean soil and sod. The pesticide residues had spread over the school from truck and equipment washing activities at the company and contaminated soil down to five feet in some areas on the school.

***d.) Avalon K-12 Schools, Avalon, Catalina Island***

During modernization activities in this past summer (Summer 2001), the contractor found significant amounts of ash and debris buried in the playground area of the elementary portion of Avalon Schools. Analytical tests revealed that there were high levels of lead present in the soil. In addition, follow up sampling at the recommendation of DTSC confirmed the presence of elevated levels of dioxins and furans in the ash and soil. Upon the request of the parents and eventually the school district, DTSC initiated a preliminary surface soil investigation of school. The school was closed and classes were held at alternative locations on the Island for three weeks. Most of the surface areas of the school did not have lead or dioxin contamination, however two areas were identified in the investigation. Both of these areas are currently restricted from access by staff and students. A further investigation of the subsurface soils will be conducted

at the school in the near future. Lead and dioxin contamination are present in the near surface soils in several areas of the school. Remedial actions are tentatively scheduled for summer, 2002.

***e.) Park Elementary School, Cudahy***

Park Elementary School was built on property that contained a landfill used for local industrial hazardous wastes, containing primarily petroleum related wastes and heavy metals. The playground, as well as the adjacent park, is on top of the former landfill. The site came to DTSC's attention following reports of black, tarry like substances surfacing on the playground in the late 1980's. An interim remediation was conducted at the school in the early 1990's under DTSC oversight, where some of the soils were excavated, a liner installed, several feet of clean fill placed on top of the landfill material, and vents installed. Additional investigations have been conducted over the last eighteen months and the school district has committed to the community to remove all the remaining landfill wastes that are under the playground. While DTSC has not been able to establish any current exposures at the school, the community concerns about this school have been very high, and a number of illnesses have been reported at the school.

***f.) Noah Webster Elementary School, San Diego***

Noah Webster Elementary was built in the late 1950's on top of a former burn ash dump in San Diego. In the years preceding the school, municipal trash was taken to areas outside of the immediate city and burned. The depth of the ash under the school ranges from ten to thirty feet. There are approximately three to five feet of soil on top of the burn ash. DTSC is partnered with the school district, the Local Enforcement Agency (LEA) for San Diego County, and the Regional Water Quality Control District to investigate and characterize any potential environmental impacts at the school. Soil sampling is currently being conducted for this project.

***g.) Jersey Elementary School, Santa Fe Springs***

Jersey Elementary School was built in the 1960's adjacent to an area that had contained waste water treatment ponds primarily for petroleum wastes. During the life of the ponds, wastes had routinely overflowed into the area that is now the playground of the school. A city park now overlies the original waste ponds. During trenching for footings for new portables in the playground in the spring of 2001, soils contaminated with oil/tarry wastes were encountered. DTSC was notified and the entire school was characterized during the summer 2001. Contaminated soils were found throughout the grassy playground area, although the remainder of the school was not contaminated. The playground area has been fenced off until a soil removal action is completed. Additional studies are scheduled for the adjacent park.

***h.) Laguna Nueva Elementary School, Montebello***

The Laguna Nueva Elementary School was recently built on a partially excavated landfill. The school was initially investigated by DTSC because a proposed addition on the adjoining property. Tests revealed high levels of methane in the soil on the school property. Additional testing is scheduled for the school and remediation options are being evaluated.

**c. Planned Activities for the Next Two Years**

Based upon close interaction between DTSC and school districts across the state, DTSC has projected that there will continue to be a steady flow of proposed school sites requiring review and approval. Guidance to improve the screening and review of these properties is currently being drafted. These will be completed and issued in the next calendar year. Additional guidance will be initiated as issues and areas of concern become apparent. This may accelerate as school districts continue to acquire inner-city properties for development.

DTSC is drafting emergency regulations to streamline the process for evaluation and remediation of proposed schools sites where the only contaminant of concern is lead contamination in the soil from lead-based paints used on buildings.

DTSC is developing a comprehensive database that will enable DTSC to identify trends, regional problems, similar clean-up responses, and costs to remediate school sites. This information will be used for developing new approaches to investigation, risk assessment, and remediation.

DTSC will continue to provide the Office of Environmental Health Hazard Assessment (OEHHA) with reports containing information and data on the Schools Program for use in selection of chemicals of concern to children and development of exposure scenarios specific to children at school.

Existing schools are required to have DTSC oversight for environmental assessment if they are constructing a significant addition that requires state funding. The school districts are currently not required to involve DTSC when hazardous materials are discovered during other activities such as modernization, installation of portable classrooms, or routing maintenance. Furthermore, the school districts are not required to involve DTSC when concerns arise about hazardous materials from adjacent properties. DTSC will continue to provide assistance to existing schools when requested; however, DTSC has no authority to provide environmental oversight in situations where hazardous material may be present at existing school sites.

**d. Program Benefits to Children's Environmental Health**

Because children spend a significant amount of their waking hours in the school environment where they can have contact with potentially contaminated soils, schools can be seen as extension of their living environment. This is especially true in areas where school facilities include extended day-care units, so potential exposures to contaminants can occur even at

the pre-kindergarten level. Ensuring that these school environments are not contaminated with hazardous materials, creates a safe living environment protective of childhood development. DTSC has evaluated new school properties and a handful of existing schools in order to determine that they are safe from both short term and long term health risks from contaminated soils. The DTSC environmental overview has helped motivate school districts to become more selective in evaluating potential school properties, and the program has enabled community members and parents a more active participation role in selection of school properties.

**e. Recommendations**

As discussed in the section on Emerging Issues: Existing Schools, there is no current systematic assessment or procedure for existing schools that encounter or suspect hazardous materials on their properties that require the involvement of environmental oversight agencies, such as DTSC. As described in Emerging Issues, there are a number of examples of existing schools with significant environmental contamination that either have required or will require remediation. The potential number of these schools throughout California may be in the hundreds. One of the critical issues identified by school districts is the lack of specific funding to address these environmental issues. Further study of existing schools may be appropriate in order to assess this potential problem.

### 3. Integrated Pest Management (IPM) at Schools

#### a. Purpose and Requirements of the Legislation

##### *The California School IPM Program and the Healthy Schools Act*

Department of Pesticide Regulation



In 1993, the Department of Pesticide Regulation (DPR) began a pilot program to work with interested school districts to provide them information about integrated pest management (IPM) practices and assist them in developing an IPM program. DPR also conducted an extensive survey of school districts in 1996 to gain information about their IPM policies and practices. Governor Davis felt that IPM in schools was important enough to add a school IPM program to DPR's budget in July 2000, as part of his Children's Environmental Health Initiative. Governor Davis later signed the Healthy Schools Act (AB 2260 Shelly "School Safety" Chapter 718, Statutes of 2000) into law on September 25, 2000. This law, authored by Assembly Member Kevin Shelley, puts into code DPR's existing voluntary

California School IPM Program and adds some new right-to-know requirements regarding pesticides, such as notification, posting, and record keeping for schools, and enhanced pesticide use reporting for licensed pest control businesses. Most provisions of the Healthy Schools Act took effect January 1, 2001. The Healthy Schools Act establishes least-hazardous IPM as the state's preferred method of school pest control. The Act defines this approach as follows: "a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using nonchemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property, and the environment, are used only after careful monitoring indicates they are needed according to pre-established guidelines and treatment thresholds." Through its school IPM program, DPR is committed to facilitating voluntary establishment of IPM policies and programs in schools throughout California, while assisting school districts with implementation of the new Education Code requirements.

How is DPR helping school districts?

- Establishing an IPM in Schools Web site. Visit DPR's Web site, [www.cdpr.ca.gov](http://www.cdpr.ca.gov) (click on the School IPM link), where you can download samples of letters to parents about expected pesticide use and the registry, and a template for the warning sign. Keep checking the Web site for additional information. In the future, DPR will provide information on least-hazardous pest management alternatives.
- Identifying and training individuals designated by school districts to carry out school IPM. DPR will conduct voluntary train-the-trainer programs so that those who carry out the IPM

program understand principles of IPM and can train staff. DPR will also host regional workshops that showcase model IPM programs and provide hands-on experience.

- Assisting school districts to establish IPM policies and programs. Some school districts already are working with DPR to establish IPM programs. Currently, DPR is working with California Department of Education and will soon post information on its Web site about pilot programs. In addition, DPR publicizes its California School IPM Program at meetings attended by maintenance and operations directors and their staff, school administrators, educators, and parents.
- Developing a model IPM program guidebook. DPR will tailor an existing school IPM guidebook to conditions in California. Pests to be covered include insects, mites, rodents, birds, diseases of landscape plants and turf, and weeds.
- Evaluating adoption of IPM programs by schools. Baseline and follow-up surveys will help DPR measure adoption of IPM programs by schools, evaluate what kind of outreach school districts need, and whether this outreach has been effective.

In addition to the activities outlined above, the law adds certain requirements to the Education Code (EC sections 17608–17613) to be implemented for the first time in the 2001–2002 school year:

- ♦ Each school district shall annually provide written notification with specified information on pesticides to all school staff and parents or guardians of students. The school district shall identify in this written notification all pesticide products (some products are exempt) it expects to be applied by district staff or an outside contractor in the upcoming year, and the Internet address to DPR's School IPM Program Web site (see below).
- ♦ Each school shall provide the opportunity for interested staff and parents to register with the school district if they want to be notified of individual pesticide applications at the school before they occur.
- ♦ The school district shall post warning signs at each area of the school where pesticides will be applied. These signs are posted 24 hours in advance and 72 hours after applications and should be sufficient, in the district's opinion, to restrict uninformed access to treated areas.
- ♦ Each school shall maintain records of all pesticide use at the school for four years and make the records available to the public upon request.
- ♦ Each school district is to designate an individual (also known as an IPM coordinator) to carry out these requirements.

To assist school districts, DPR has posted on its Web site samples of the annual notification and the register, and a template of the warning sign. These documents can be downloaded at [www.cdpr.ca.gov](http://www.cdpr.ca.gov) (click on the School IPM link).

The new law (Food and Agricultural Code section 13186) requires that:

- Licensed pest control businesses shall report pesticide applications by school annually to the Director of the Department of Pesticide Regulation beginning with applications made on or after January 1, 2002.

The law (Food and Agricultural Code sections 13180–13185) also adds certain requirements of DPR:

- ♦ DPR shall prepare a school pesticide use reporting form to be used by licensed pest control businesses when they apply any pesticides at a school. Licensed pest control businesses must submit the form to DPR at least annually.
- ♦ DPR shall establish and maintain a School IPM Web site that contains information on pesticide products, a comprehensive directory of resources describing and promoting least-hazardous pest management practices at schools, the model program guidebook, and ways to reduce the use of pesticides at school facilities. It also provides the public with information about public health and environmental impacts of pesticides.
- ♦ DPR shall promote and facilitate the voluntary adoption of IPM programs for school districts that voluntarily choose to do so, while it assists all school districts to comply with the new provisions of the Education Code.

#### **b. Accomplishments as of January 1, 2002**

- As part of its Children's Environmental Health Initiative, the Davis Administration earmarked \$634,000 in fiscal 2000-01 for the Department to develop voluntary school IPM programs. In 2000, DPR created a School IPM Advisory Group, consisting of 30 key school organizations and other interested stakeholders. This group has met twice to advise DPR about school IPM program elements, such as the goals and content of the School IPM Web site, a draft Frequently Asked Questions document, the model IPM program guidebook, and DPR's outreach efforts through staff presentations on the Healthy Schools Act and direct mailings. The advisory group's advice is most helpful to ensuring that this program provides the best support possible for its constituent groups and achieves its mandated goals.
- Initially, DPR established a temporary California School IPM Program Web site with information for schools and parents about the Healthy Schools Act (see DPR's home



page at [www.cdpr.ca.gov](http://www.cdpr.ca.gov), click on School IPM). School districts could download samples of the annual notice of expected pesticide use and the notice to register for notification of each pesticide application at a school, and a template of the warning sign. A copy of the law was also downloadable. In addition, this Web site provided links to more information about IPM programs, IPM practices, and public health impacts of pesticides. DPR continued to expand the resources on the Web site, and developed a more comprehensive Web site to replace the temporary one. This permanent Web site provides a comprehensive set of resources describing and promoting least-hazardous pest management practices at schools.

- DPR co-sponsored a regional School IPM Expo in Novato with the Marin County Department of Agriculture. The Expo, hosted by the Novato Unified School District on July 18, 2001, reached over 19 school districts, 6 cities, and 18 counties. The Expo featured exhibits and demonstration sessions for the entire school community—administrators, business managers, maintenance and operation staff, groundskeepers, and IPM coordinators. Also in attendance were structural pest control operators, pest control advisors, and manufacturers of IPM products, licensed and certified applicators, and maintenance gardeners.
- DPR staff has made over 50 presentations statewide providing information on the Healthy Schools Act, the components of DPR's California School IPM Program, and an introduction to IPM. The audiences included school administrators, business managers, risk managers, maintenance and operation staff, groundskeepers, and IPM coordinators.
- DPR, in cooperation with the California Department of Education (CDE), mailed all 1,000-school districts information about the requirements of the Healthy Schools Act and how DPR and CDE can assist them with its implementation. DPR also included information to promote and facilitate the voluntary adoption of an IPM program. In addition, the material also included a California School IPM Program Overview that briefly summarizes the Healthy Schools Act and the assistance DPR provides to school districts.
- The Healthy Schools Act requires each school district to designate an individual (also known as an IPM coordinator) to carry out its requirements. DPR worked with the school districts to identify these IPM coordinators. DPR provided them information to assist school districts to comply with the new provisions of the Healthy Schools Act, and to promote and facilitate the voluntary adoption of IPM program for school districts that choose to do so.
- DPR has drafted some sections of its model IPM guidebook.
- DPR continues planning for its regional training workshops for school district IPM coordinators to be held beginning next year (2002).

- The Healthy Schools Act requires DPR to develop a pesticide use reporting form to be used by licensed pest control businesses when they apply any pesticides at a school. Licensed pest control businesses must submit the form to the Director of DPR at least annually beginning with applications made on or after January 1, 2002. DPR drafted regulations that were approved to put in place the reporting requirements and form. In November 2001, DPR mailed the pesticide use reporting form and information on the Healthy Schools Act to all licensed pest control businesses in the state.
- To evaluate IPM adoption in schools, DPR plans to conduct various surveys. In 2001, DPR conducted a baseline survey to provide information on various pest management policies and practices, and to identify resources that school districts might need for implementing IPM. The information obtained from this survey will assist DPR to develop materials to help school districts comply with the law and improve pest management practices. Baseline questions were also included to enable us to evaluate progress made by the school districts in the future. About 39 percent of the districts responded. DPR plans to finalize the report this year and mail it to all school districts.
- At the request of the County Agricultural Commissioners (CACs), DPR established a working group composed of representatives from among the CACs, the California Department of Education, and DPR staff. The purpose of this group was to clarify state and county roles in enforcing provisions of the Healthy Schools Act, and to coordinate CAC interface with implementation of the Healthy Schools Act. The working group developed a written policy that clarified state and county roles in enforcement of the Healthy Schools Act. DPR mailed it to all school districts and CACs.

#### **c. Planned Activities Over the Next Two Years**

- DPR's School IPM Advisory Group will continue to meet and provide valuable suggestions to DPR's program. DPR next plans to seek its input on the train-the-trainer program that it is planning.
- Among other provisions, the law requires schools to post notices before and after pesticide applications, and send parents an annual list of pesticides that may be used at school. DPR already provides some school IPM information on its Web site, and will expand online resources under the law. To support DPR's implementation of these new requirements, the Davis Administration earmarked \$380,000 in fiscal 2001-02 to develop a component on DPR's Web site that allows school districts to easily and properly identify and list the active ingredients of pesticide products they expect to be applied during the upcoming year, establish and maintain an easily identified link that provides the public all appropriate information on public health and environmental impacts of pesticide active ingredients and ways to reduce the use of pesticides at school facilities, compile and post to our Web site summaries of labels for pesticides used at schools, and modify the pesticide use reporting system to accommodate the new use reporting data that DPR's director will receive beginning in 2002.

- In addition, DPR plans to update and modify its Web page on the California School IPM program to provide the most up-to-date, comprehensive set of resources that promote the use least-hazardous pest management practices at schools. DPR will also update information and links that provide the public with all appropriate information regarding the public health and environmental impacts of pesticide active ingredients and ways to reduce the use of pesticides at school facilities.
- DPR will finish drafting sections and finalize its model IPM program guidebook. This guidebook will prescribe essential program elements for a school district that has adopted a least-hazardous IPM program, and will provide guidance on a variety of topics. DPR will distribute the model program guidebook to school districts and will establish a process to systematically update the guidebook and its supporting documentation.
- Many of DPR's California School IPM Program activities will be involved with planning and developing materials for its IPM training program. The purpose of this training program is to facilitate the adoption of a model IPM program and least-hazardous pest control practices by school districts. In the spring of 2002, DPR will hold its first pilot train-the-trainer regional workshop. Then, DPR plans to conduct regional training throughout the state on an on-going basis.
- DPR plans a variety of outreach efforts. DPR plans to finalize its Frequently Asked Questions document and make that available to various target audiences. DPR staff will continue to make presentations to provide information about the Healthy Schools Act and components of DPR's California School IPM Program. These efforts will target school boards and school district superintendents, business managers, and risk managers to publicize DPR's training program and to promote and facilitate the voluntary adoption of an IPM program. DPR also plans to publish articles about its California School IPM Program and the Healthy Schools Act in key school publications.
- DPR plans to conduct a follow-up survey with school districts statewide to evaluate their practices and how effective DPR's outreach efforts are. DPR will finalize the results in a report and provide them to all school districts. DPR plans to use the information to revise its outreach efforts, as needed.

#### **d. Program Benefits to Children's Health**

- The Healthy Schools Act increases information to parents and guardians of students and to staff about pesticide use at their schools.
- In addition, the Healthy Schools Act establishes effective least-hazardous IPM as the state's preferred method of school pest control. It defines this IPM approach as a pest management strategy focusing on long-term prevention or suppression of pest problems through combinations of techniques that minimize risk to people, property, and the environment. IPM methods emphasize monitoring for pest presence and establishing treatment thresholds levels; non-chemical strategies to make the habitat less attractive to

pests; improved sanitation; and mechanical and physical controls. Effective pesticides that pose the least possible hazard are used only after careful monitoring indicates they are needed according to pre-established guidelines and treatment thresholds.

- DPR has a legal mandate to encourage the use of more environmentally sound pest management systems, including IPM. DPR emphasizes a reduced-risk approach to risk management by promoting and facilitating adoption of IPM programs by school districts. DPR encourages the development and adoption of pest management practices that reduce the overall risk to human health and the environment.

#### **e. Recommendations**

- We recommend that funding continue at its present level to develop and fully implement all program elements. Such activities will have a great impact on reducing potential risk in schools due to pesticide use.

#### ***IPM and Environmental Health Education***

Although not part of its mandated activities, DPR also works with other boards and departments of the California Environmental Protection Agency and with the California Department of Education to tie IPM into related areas such as school gardens and environmental education.

##### **1. URBAN INITIATIVE**

In California, pesticides used in or around the home may include illegal (unregistered) pesticides, or legal pesticides that are misused or improperly disposed. Through its Urban Initiative Program, the U.S. Environmental Protection Agency (EPA) awarded DPR \$150,000 for a two-year period to address these issues.

The use of insecticidal chalk—an illegal product imported from China—has become popular in many areas of California. The chalk, sold at flea markets and small neighborhood retail stores, is commonly used to control ants and cockroaches. Because it looks identical to blackboard chalk, children have become ill from handling or eating it. Between 1992 and 1995, Poison Control Centers nationwide received 668 reports of incidents involving insecticidal chalk. Other pesticides may be repackaged by residential users and mistaken for non-pesticidal products. Pesticides may be illegally or inappropriately used in classrooms to treat pests. Additionally, in residential areas, inexperienced pesticide users may over-apply pesticide products, resulting in contamination of creeks, rivers, lakes, and oceans. Thus, illegal and improper pesticide use threatens both human health and the environment.

In April 2001, DPR awarded most of the U.S. EPA funding—\$120,000—to the Aquatic Outreach Institute (AOI) of Richmond for an environmental education program, "Watching Our Watersheds." The group will develop train-the-trainer workshops for sixth- through twelfth-grade

teachers in an area that includes Alameda, Contra Costa, and San Francisco counties. Teachers will receive training in safe use and disposal of pesticides, as well as IPM—integrated pest management for homes, gardens, and schools. IPM stresses working with nature to encourage a healthy environment with minimal pest problems.

The eighteen-month schedule calls for training 120 teachers, with the goal of developing a workshop curriculum that can be used statewide in urban and rural school districts. Once teachers have completed the training, they will be provided with an extensive activity-based binder that includes projects easily performed with students, and instructions explaining how to conduct pollution-prevention projects on or near the school grounds. The teachers should also have the opportunity to apply for stipends from AOI (with oversight from DPR) to develop specific classroom projects educating students about the hazards associated with illegal pesticides and improper pesticide use and disposal.

AOI will develop a fact sheet to inform school maintenance personnel and administrators about the hazards of using illegal pesticides (such as insecticidal chalk) and the importance of proper pesticide use and disposal. DPR will use the remaining funds from U.S. EPA for similar outreach activities.

## 2. KIDS IN GARDENS

DPR is also funding AOI through its competitive Pest Management Grant Program to conduct school garden workshops. The workshops draw kindergarten- through twelfth-grade teachers who learn about soil, composting, plant propagation, and IPM. As with the Watching Our Watersheds program (see above), workshop alumni may apply for stipends to develop special classroom projects. Now in its second year, AOI is expanding on the program to include San Francisco Park and Recreation staff, who will create after-school gardening programs that incorporate IPM. DPR awarded AOI \$80,000 over a two-year period for six two-day workshops, in which 180 educators will be trained.

## 3. CALIFORNIA ENVIRONMENTAL EDUCATION INTERAGENCY NETWORK (CEEIN)

DPR participates in CEEIN, a consortium of environmental educators representing California state departments, boards, and commissions of the Department of Education, Cal/EPA, and the Resources Agency with oversight to protect California's environment. DPR contributes \$1,000 annually to support the Disney Company's Environmentality Program, which encourages fifth-grade classrooms throughout California to design creative environmental projects.

## 4. OTHER ENVIRONMENTAL EDUCATION INVOLVEMENT

DPR also participates in the Cal/EPA Environmental Education Team, an offshoot of CEEIN, which consists of members from Cal/EPA.

DPR is working with the California Integrated Waste Management Board (CIWMB) to make IPM a component of the following two programs: (1) Waste Diversion Project—CIWMB will establish up to five pilot projects with school districts in California to divert waste (food and green waste, paper, plastic, metals, textbooks and other teaching material) from the waste stream; and (2) School Instructional Gardens Project (with Calif. Dept. of Education)—This program will assist CIWMB in meeting its statutory public education requirements by implementing an educational program that teaches source reduction, recycling, composting, nutrition education, and integrated waste management concepts as a component of the garden program.

#### **4. *Playground Equipment and Surfacing Replacement***

##### **a. *Playground Safety and Recycling Act Grant Program***

###### **1.) *Purpose and Requirements of the Legislation***

Chapter 712, Statutes of 1999 (Assembly Bill 1055) established the Playground Safety and Recycling Act Grant Program, to be administered by the California Integrated Waste Management Board (CIWMB). This competitive grant program assists local public educational agencies in upgrading the State's public playgrounds using equipment made from recycled-content materials. The use of recycled-content materials and equipment will help conserve resources and develop markets for these types of materials. Chapter 78, Statutes of 1999 (AB 1115), appropriated \$2,000,000 to the California Superintendent of Public Instruction for the purposes of these grants; these monies were appropriated from the Proposition 98 education fund by the FY 1999/2000 Budget Act.

The grants are specifically to be used to upgrade the State's public playgrounds to prevent injuries and satisfy the Department of Health Services' new playground design and safety regulations (Health and Safety Code 115725). Because the initial funding for this grant is made available from Proposition 98 money, eligible applicants are limited to local public educational agencies that:

- Demonstrate the ability to provide a 50 percent match (of the grant). This amount may be reduced to a 25 percent match (of the grant), upon finding by the CIWMB that the 50 percent match requirement would impose an extreme financial hardship on the applicant. (To be eligible for a 25 percent match, a school must have 85 percent or more of its student population eligible for the free or reduced cost school lunch program. A Justification Form for extreme financial hardship was included in the grant application.)
- Guarantee that 50 percent of grant funds will be used for the improvement or replacement of playground equipment or facilities through the use of recycled-content materials.
- Have an initial playground inspection conducted by a playground safety inspector, certified by the National Playground Safety Institute, to determine the need to satisfy the regulations set forth by the Department of Health Services. This inspection must have occurred after January 1, 1998.

Provided that the applicant met the above requirements, two or more local public agencies operating a playground as a joint venture, under an agreement, were eligible to apply for grant funding. The local educational agency needed to be the lead agency listed on the grant application.

Eligible projects included, but were not limited to: play equipment, surfacing, fencing, signs, internal pathways, internal landforms, vegetation, and related structures such as

lighting, benches, or any other additions or improvements as deemed necessary by the applicant.

A project was eligible if it:

1. related to a public playground that has been inspected by a certified playground safety inspector after January 1, 1998, and prior to submission of a grant request; and
2. addressed the upgrade, repair, refurbishing, installation, or replacement of public playground facilities which included any play equipment, surfacing, fencing, signs, internal pathways, internal landforms, and related structures; and
3. used fifty (50) percent of the grant funds for the purchase and installation of recycled-content material.

"Playground" means an improved outdoor area designed, equipped, and set aside for children's play that is not intended for use as an athletic playing field or athletic court, and includes in that area such facilities as play equipment, surfacing, fencing, signs, internal pathways, internal land forms, vegetation, and related structures. An athletic playing field or athletic court was not eligible for these grant funds. "Athletic Playing Field" means an area in which a game or event is to be played, practiced or held, including basketball courts, soccer fields, football fields, baseball fields, tennis courts, field tracks, and racquetball courts. A playing field is not a playground. "Athletic Court" means an area that may be paved or unpaved which has lined boundaries in a playing field. An athletic court is not a playground.

## **2.) Accomplishments as of January 1, 2002**

Awards: Staff distributed the Notice of Funds Available (NOFA) on April 17, 2000 to more than 7,940 interested parties. The NOFA was also made available on the Board's web page. The application period extended from May 4, 2000 to June 30, 2000. By June 30, 2000, the Board had received a total of 397 applications totaling \$8,681,251 in requested funding. Three applications were deemed ineligible by the CIWMB Legal Department. The grant program was intended to fund grants up to \$25,000 each, not to exceed \$2 million for this grant cycle. The amount available from Proposition 98 funds was only \$2,000,000 (42 percent of the amount requested from those applications that passed the scoring criteria). Of the 397 applications received, 68 percent of the applications were from southern California and 32 percent were from northern California. The allocation of funds was based on the estimated population of each county in January 1999, provided by the Department of Finance (DOF). Northern California counties are all those North of and including Monterey, Kings, Tulare, and Inyo. Southern California counties are defined as those counties South of and including San Luis Obispo, Kern, and San Bernardino.

Of the 394 applications scored, 213 (54 percent) achieved a passing score: 70 from northern California and 143 from southern California. The funding requests from the passing applications totaled \$4,767,307. Since the total funding requests of the passing applications exceeded the funds available, a random number generation selection



method was implemented pursuant to Title 14, CCR, Division 7, Chapter 7.2, Article 4, § 18576. When planning the funding strategy, the Board had specified that \$800,000 (40 percent of the \$2,000,000 appropriated by the Legislature for this program) was to be allocated to applicants from northern California and \$1,200,000 (60 percent) was to be allocated to applicants from southern California. Staff recommended that the Board award the 36 randomly chosen projects from northern California for a total amount of \$798,436 and the 54 randomly chosen projects from southern California amounting to \$1,196,573. The remaining amounts (\$1,564 for northern California and \$3,427 for southern California) were too small to allocate to playground refurbishing projects. . Nine percent (8 of the 90 applications recommended for funding) demonstrated extreme financial hardship and were eligible for a 25 percent match based on the criteria specified above.

### **3.) *Planned Activities over the Next Two Years***

This grant program will sunset April 2002.

### **4.) *Program Benefits to Children's Health***

Grant money from the Playground Safety and Recycling Act Grant Program has not only helped conserve resources and developed markets through the use of recycled-content material; it contributed to creating safe playgrounds for school children. Schools were required to upgrade their playgrounds to prevent injuries. Children at 90 playgrounds throughout the State now benefit from improved "fall surfaces", surfacing that extends approved distances from equipment, play structures that are adequately spaced, elevated pieces of equipment that now have handrails, and equipment that does not have sharp points, pinch or entrapment hazards.

### **5.) *Recommendations***

Proposition 98 funded the Playground Safety and Recycling Act Grant Program. Through this program, the Board was able to fund 90 school playground projects. However, thousands of school playgrounds continue to violate the Department of Health Services' regulations. Although the State is suffering economically, this program is in urgent need of future funding to prevent further potentially life-threatening school playground accidents and injuries.

## **b. Park Playground Accessibility and Recycling Grant Program (Villaraigosa-Keeley Act) - 1st Cycle & 2<sup>nd</sup> Cycle**

### **1.) *Purpose and requirements of the legislation***

The Park Playground Accessibility and Recycling Grant Program was established by the Safe Neighborhoods, Clean Water, Clean Air, and Coastal Protection (Villaraigosa-Keeley Act) Bond Act. This Act authorized the CIWMB to administer a grant program to upgrade public park playgrounds using recycled-content materials and to assist park districts in meeting state and federal accessibility standards relating to public playgrounds

(Public Resource Code (PRC) § 5096.310(x)). The upgrades were required to comply with state and federal accessibility requirements and to satisfy the California Department of Health Services' playground safety regulations. The FY 2000/2001 Budget Act and the FY 2001/2002 Budget Act each appropriated \$2.558 million of Proposition 12 (the 1999 "Park Bond") money to fund the Park Playground Accessibility and Recycling Act Grant Program cycle one and cycle two respectively.

The CIWMB administered both cycles of the Park Playground Accessibility and Grant competitive grant program to meet the requirements of the act. Fifty percent of the grant funds must be used to purchase playground equipment made from recycled-content materials (Public Resources Code (PRC) § 5096.310(x)). As in the case of the Playground Safety and Recycling Grant Program, this required use of recycled-content materials and equipment will help conserve resources and develop markets for these products. The Park Playground Accessibility and Grant program is for the refurbishment of existing playgrounds, not for new construction. Playground upgrades are to be designed to increase accessibility and prevent injuries while satisfying the Department of Health Services' regulations, found in California Code of Regulations (CCR) Title 22, Chapter 22. The grant program is intended to fund projects up to \$50,000 each, with total grant allocations not to exceed \$2.558 million for each grant cycle.

**Eligibility:** Park districts in California meeting the definition of "district" as defined in the Villaraigosa-Keeley Act could apply. This included cities, counties, cities and counties, and federally recognized California Indian tribes that operate parks with playgrounds for which there is no park or special district. One application per district (or city, city/county, county or tribe) to refurbish one public playground was accepted for each grant cycle. Two or more local public agencies operating a playground as a joint venture, under an existing agreement, were also eligible to apply. The local park district (or city, city/county, county, or tribe in areas where there is no park district) was required to be the lead agency on the grant application and the lead agency in managing the playground. A formal inter-agency agreement such as a Joint Powers Authority (JPA) or Memorandum of Understanding (MOU) was required to be in place before the application deadline. Applicants were required to:

- Guarantee that fifty (50) percent of grant funds would be used for the improvement or replacement of playground equipment or facilities using recycled-content materials.
- Demonstrate the ability to provide a 50 percent match of the grant funds that could be reduced to 25 percent, upon finding by the Board that the 50 percent matching requirement would impose an extreme financial hardship on a local agency applying for a grant (PRC § 5096.310(x)). To be eligible for the reduced 25 percent match in the first cycle, the local public agency playground project must have been located in an Enterprise Zone as determined by the Trade and Commerce Agency. To be eligible for the reduced 25 percent match in the second cycle, the local public agency playground project must have been located in a zip code for which the median household income is at or below sixty-four (64) percent of the state median household income of \$35,798.

- Document that the playground had an initial playground inspection conducted by a playground safety inspector certified by the National Playground Safety Institute, to satisfy the regulations set forth by the Department of Health Services. This inspection must have occurred after January 1, 1998 and prior to submission of the application.
- Agree to erect a sign pursuant to the Villaraigosa-Keeley Act and guidelines developed by the Resources Agency acknowledging the source of funds (PRC § 5096.309).

Projects not meeting the definition of a “playground” (as defined above), such as tennis courts, skateboard facilities, swimming pools, restrooms, athletic playing fields or athletic courts, etc., were not eligible for funding.

## **2.) *Accomplishments as of January 1, 2002***

Awards: Staff distributed the Notice of Funds Available (NOFA) on September 11, 2000 to 2,200 interested parties. The NOFA was also made available on the Board's web page. The application period extended from November 8, 2000 to January 31, 2001. By January 31, 2001, the Board received a total of 84 applications totaling \$3,708,243 in requested funding. Of the 84 applications received, 54 percent (44 applications) were from northern California and 46 percent (38 applications) applied for funds from southern California. The division of the state was as described above, and based on the estimated population of each county in January 1999, provided by the Department of Finance (DOF).

The funding requests from all passing applications totaled \$2,543,099. Of the 82 applications scored, 56 (68 percent) achieved a passing score. These included 33 applications from northern California (59 percent) and 23 applications from southern California (41 percent). Staff recommended that the Board award all 33 northern California projects for a total amount of \$1,514,377 and all 23 southern California projects for a total amount of \$1,028,722. The combined total for the 56 projects is \$2,543,099. The first cycle of the Park Playground Accessibility and Recycling Grant Program will close April 2003.

## **3.) *Planned Activities Over the Next Two Years***

The second cycle of the Park Playground Accessibility and Recycling Grant Program received 103 eligible applications at its deadline on August 31, 2001. Staff anticipates funding approximately 50 projects. This cycle will close April 2004.

## **4.) *Program Benefits to Children's Health***

Although this is not a school program, school-age children directly benefit from the increased accessibility to public park playgrounds. Grant money from the Park Playground Accessibility and Recycling grant program has not only helped conserve

resources and developed markets through the use of recycled-content material; it contributed to creating accessible playgrounds for school children. Both children and care-givers visiting public playgrounds benefit from accessible surfaces, surfacing that extends approved distances from equipment, play structures that are adequately spaced and accessible, elevated pieces of equipment that now have handrails, and equipment that does not have sharp points, pinch or entrapment hazards.

## **5.) *Recommendations***

Proposition 12 funded the Park Playground Accessibility and Recycling Grant Program. Through this program, the Board was able to fund 56 public playground projects. However, thousands of public playgrounds continue to violate the Department of Health Services' regulations. Although the State is suffering economically, this program is in urgent need of future funding to prevent further potentially life-threatening public playground accidents and injuries.

### **c. Playground Cover and Track Surfacing Grant Program**

#### **1.) *Purpose and requirements of the legislation***

The purpose of this competitive grant program is to fulfill the legislative mandates by assisting in the development of markets for products manufactured from California waste tires and supporting the diversion of waste tires from landfills and stockpiles. The CIWMB offers the Waste Tire Track and Other Recreational Surfacing Grant Program to encourage the reduction of landfill disposal and stockpiling of California waste tires. The California Integrated Waste Management Board (CIWMB) receives an annual appropriation from the California Tire Recycling Management Fund (Tire Fund) to administer the Tire Recycling Act (Act) (Statutes of 1989, Chapter 974) and related legislation. This Act provides for the Board to award grants to local governments. Further, PRC 42872(a) allows for the awarding of grants to public entities involved in activities and applications that result in reduced landfill disposal or stockpiling of waste tires and section PRC 42889(g) requires the CIWMB to assist in developing markets for waste tires. As part of the Act, CIWMB offered the Waste Tire Playground Cover Grant Program.

The Board's FY 1999/2000 Tire Fund allocations provide \$450,000 for Playground Cover Grants. With the passage of Senate Bill (SB) 876 (Escutia, Statutes 2000, Chapter 838) the tire fee was increased to one dollar (\$1.00) per tire enhancing the potential resources available for this program. SB 876 authorized CIWMB to allocate monies from the Tire Fund in a manner consistent with a five-year plan that was developed and approved by the Board and submitted to the Legislature.

As of July 2001, this program was divided into two distinct programs, the Waste Tire Playground Cover Grant Program and the Waste Tire Track and Other Recreational Surfacing Grant Program. In the Board-approved Five-Year Plan, staff proposed funding for the next five fiscal years at \$800,000 per fiscal year for playground cover (with a

maximum of \$25,000 per grant) and funding for the next five fiscal years at \$1,000,000 per fiscal year for track and other recreational surfacing (with a maximum of \$100,000 per grant).

Eligibility: Public entities that operate and manage a public recreational site in California are eligible to apply. "Public entities" are cities, counties, a city and county, colleges, universities, state owned recreational facilities, public school districts, qualifying California Indian tribes, park districts, and special districts. Only one application per jurisdiction was accepted for the FY 2001/2002 grant cycle. Eligible projects for the Waste Tire Track and Other Recreational Surfacing Grant Program include surfacing material that is placed underneath and around recreational sites. "Recreational Site" means an area designed, equipped, and set aside for the public's recreation. For purposes of this grant program a playground is not considered a recreational site. Examples of recreational sites include, but are not limited to, running tracks, tennis courts, skateboard parks, swimming pools, soccer fields, football fields, hockey fields, weight rooms, and fairgrounds. Eligible projects for the Playground Cover Grant include surfacing material that is placed underneath and around playground equipment. Applicants must submit a plan for a project that includes materials manufactured from California waste tire rubber.

## **2.) *Accomplishments as of January 1, 2002***

The Waste Tire Playground Cover Grant Program received 44 applications at its first application deadline: October 26, 2001. Waste Tire Track and Other Recreational Surfacing Grant Program received 31 applications at its first application deadline: October 26, 2001.

Awards: The current cycle Notice of Funds Available (NOFA) was distributed the first week of November 1999, to more than 3,000 interested parties and was also made available on the Board's website. The application period extended from early November 1999 to February 18, 2000. A total of 67 applications were received totaling \$1,495,000 in requested funding. Of the 67 applications received, 44 applications received passing scores, requesting a total of \$1,012,918.

## **3.) *Planned Activities Over the Next Two Years***

Both the Playground Cover and the Track and Other Recreational Surfaces Grant Programs will be offered on an annual basis for the next five years though Fiscal Year 2005/2006.

## **4.) *Program Benefits to Children's Health***

Eligible projects for the Playground Cover Grant Program and the Waste Tire Track and Other Recreational Surfacing Grant Program are required to include surfacing material that is placed underneath and around playground equipment and recreational sites respectively. The children of California will benefit from having safe, durable, economical and accessible surfacing at playgrounds and recreational sites.

**5.) Recommendations:**

The Playground Cover and Track Surfacing Grant Program has been divided into two new programs: 1) Playground Cover and 2) Track and Recreational Surfacing. Each of these new programs was proposed and approved in the Five-Year Plan for the Waste Tire Recycling Management Program (for fiscal years 01/02-05/06). The Recreational Surfacing Grant Program was proposed to receive \$800,000 per year in funding and the Track and Recreational Surfacing Grant Program was proposed to receive \$1,000,000 per year in funding. The funding available for playground covering should be adequate to fund numerous playground cover grants for the next five years.

## **5. Art Hazards Program**

### **a. Purpose and Requirement of Legislation**

On June 1, 1987, the *Education Code: Article 6, Section 32060* was enacted. This law helps to assure that school children are sufficiently protected from art and craft materials that may be seriously harmful.

- California school districts are prohibited from purchasing products containing toxic or carcinogenic substances for use in grades K-6. The law also restricts the purchase of such products in grades 7-12, allowing their use only if they bear a label informing the user of the presence of hazardous ingredients, the potential health effects, and instructions for safe use for the art or craft products.
- This law does not restrict the purchase of art and craft or other materials for use by instructors when young children are not present.

### **b. Accomplishments as of January 1, 2002**

The Integrated Risk Assessment Section (IRAS) of the Office of Environmental Health Hazard Assessment compiled a list of products that cannot be purchased. This list is updated quarterly. IRAS has also assembled guidelines for the safe use of art and craft materials. These guidelines assist both public and private schools in California to assure that schoolchildren are not exposed to hazardous art and craft materials.

### **c. Planned Activities over the Next Two Years**

The Integrated Risk Assessment Section (IRAS) will continue to update the list and guidelines.

### **d. Program Benefits to Children's Health**

This legislation helps the California schools ensure the safety of school children.

### **e. Recommendations**

Continued support of this legislation will help ensure that children are not exposed to toxic chemicals contained in some arts and crafts materials purchased by public schools.





### ***III. Children's Environmental Health Studies***

#### **A. The Southern California Children's Health Study**

##### **1. Purpose**

Understanding the adverse health effects of air pollution on children is important because they are especially vulnerable to air pollution. Children's respiratory and immune systems are still developing, and they breathe more rapidly and are more physically active than adults. Little is known about long-term air pollution exposure health effects on children. The Children's Health Study, a 10-year study of the health effects of children's long-term exposures to southern California's high concentrations and unique mixtures of air pollutants, is providing important new information which will be useful in the setting of ambient air quality standards. More information can be found at: [www.arb.ca.gov/research/chs/chs.htm](http://www.arb.ca.gov/research/chs/chs.htm).

##### **2. Accomplishments as of January 1, 2002**

The Children's Health Study has enrolled a total of 5,400 children in 12 communities with varying mixtures of air pollutants; 3,600 of them were enrolled as fourth graders and are being followed through high school graduation. The children's pulmonary function is measured annually; questionnaires ascertain information about respiratory symptoms and illnesses and numerous factors known to affect relationships between air pollution and health. Air pollution monitoring in the 12 communities provides information about exposures to ozone, nitrogen dioxide, nitric oxide, carbon monoxide, acid vapor, particulate matter mass, elemental and organic carbon (particles smaller than 10 microns and particles smaller than 2.5 microns), and the number of ultrafine (smaller than 1 micron) particles.

The Children's Health Study has yielded many important results. For example, children living in communities with higher concentrations of nitrogen dioxide, particulate matter, and acid vapor have been shown to have lower rates of lung function growth. Poorer adult respiratory health may be a long-term consequence of these deficits in growth. The study has also obtained two recent novel and important findings on effects of ozone exposures. Children in high-ozone communities who spend more time exercising heavily out of doors have been shown to be at much higher risk of developing asthma. Short-term increases in ozone concentrations are associated with substantial increases in school absences from both upper and lower respiratory illnesses.

##### **3. Planned Activities for the Next Two Years**

The investigators will be performing many more analyses of the Study's very rich data base during the next two years, and many more important results are anticipated, possibly including findings suggesting causal relationships between pollution and health effects. Plans are being made to recontact the subjects after they have attained maximum lung growth to determine whether the observed lung growth deficits are permanent. The monitoring network has recently added the capability to monitor for ultrafine particles (0.07 microns to 1.0 microns), making it one

of the only areas in the world with an ultrafine monitoring network. Investigators will have a rich database of ultrafine exposure data from which to analyze for associations with health effects.

#### **4. *Benefits to Children's Environmental Health***

Most previous air pollution health effects research has focused on short-term exposures that might occur over a period of hours or days. This is the first large-scale study of children to examine the impacts of air pollution exposures that occur over one or more years. The information gained from this study will guide public health policies directed toward protecting children from these longer-term exposures.

### **B. Fresno Asthmatic Children's Environment Study (FACES)**

#### **1. *Purpose***

The Fresno Asthmatic Children's Study (FACES), which began recruiting children in October 2000, is the first to be sponsored by the ARB's new Vulnerable Populations Research Program. The study is being conducted by a team of researchers from a number of organizations, led by the University of California, Berkeley. More information can be found at: [www.arb.ca.gov/research/faces/faces.htm](http://www.arb.ca.gov/research/faces/faces.htm).

#### **2. *Accomplishments as of January 1, 2002***

The focus of the study is on how various environmental factors in Fresno influence the way a child's asthma progresses over time. Among the environmental influences of interest are air pollutants from man-made and natural sources. A major focus is on different components of particulate matter (PM), including PM<sub>10</sub> and PM<sub>2.5</sub> mass, particle number distributions over size ranges less than 2.5 microns, PM chemical constituents (elements [metals], nitrates, ammonium nitrate, sulfate, chloride, and adsorbed organic compounds [for example, polycyclic aromatic hydrocarbons (PAHs)]). The influence of other air pollutants, including ozone (O<sub>3</sub>), oxides of nitrogen (NO<sub>2</sub>, NO), sulfur dioxide (SO<sub>2</sub>), and carbon monoxide, as well as bioaerosols such as PM-associated endotoxins, fungi and pollen, will also be considered.

Children living in the Fresno/Clovis area between the ages of 6 and 10 who have been diagnosed by a doctor with asthma are being recruited to participate in the study. As many as 300 asthmatic children (boys and girls) are now being enrolled into the study. The children's respiratory health will be evaluated by the FACES staff at the time of enrollment and every six months during the four-year study. In addition, to evaluate the cumulative effects of repeated short-term responses to daily environmental exposures, each group of children will also participate in about 10 two-week daily follow-up periods during which measures of health, including symptoms, medications use, and lung function, will be collected daily by the children at home. The ten periods will occur about three times per year in different seasons. The study includes an extensive exposure assessment program, which will consider outdoor, indoor and personal exposures that are thought to exacerbate asthma (trigger asthma attacks or symptoms).

### **3. *Planned Activities for the Next Two Years***

The project will reach an important milestone at the beginning of 2002. Intensive ambient air and in-home monitoring efforts will begin at that time. These efforts will run for approximately 14 months and serve to provide very detailed pollutant data that will be included in analyses of health outcomes in the children. During this period, two trailers that carry extensive instrumentation will be circulated throughout the study area. The data collected by them will augment other air monitoring data that is routinely collected in Fresno. Air monitoring is supplemented by existing routine air district and ARB activities as well as an extensive federally funded Supersite network in Fresno.

### **4. *Benefits to Children's Environmental Health***

This study will shed light on at least some of the environmental factors that influence the behavior of childhood asthma as children grow. The information obtained through this project will be used in the development and evaluation of ambient air quality standards and other air pollution related public health policies implemented at the State and community level that are designed to protect against the harmful health effects of pollutants. These actions will lead to improvements in the protection of this highly vulnerable subgroup (asthmatic children), and can potentially significantly reduce the direct and indirect asthma-related costs borne by all Californians. Results of this study will await completion of data collection and analysis, but some initial observations should be available for release in approximately 18 months.

## **C. Children's Respiratory Health Study**

OEHHA is currently conducting a cross-sectional study of children in the East Bay to examine the association between measurements of traffic and children's respiratory health. Respiratory health surveys have been obtained on approximately 1100 children (8-10 years old) recruited from ten schools in three East Bay communities (Oakland, San Leandro, and Hayward). The ten schools were chosen to reflect neighborhoods that are close to or further away from major freeways. Ambient concentrations of traffic-related air pollutants (e.g., nitrogen oxides and particulates) are being measured over several seasons. In our analysis we will evaluate the relationship between ambient concentrations of pollutants at the schools and traffic density and proximity to roadway using geographic information systems methods. OEHHA will also examine whether there is an association between respiratory symptoms and exposure to traffic-related air pollutants.

The respiratory health data collection was completed in August 2001 and air pollution measurements will be completed by December 2001. A report on the results of OEHHA's study will be submitted in Summer 2002.



#### ***IV. Activities of the Children's Environmental Health Center***

The Children's Environmental Health Protection Act (Chapter 731, Statutes of 1999) created within the Cal/EPA Office of the Secretary the Children's Environmental Health Center (CEHC). The CEHC "serves as the chief advisor to the Secretary for Environmental Protection and to the Governor on matters within the jurisdiction of the Environmental Protection Agency relating to environmental health and environmental protection as each of those matters relates to children (HSC Sec. 900(a))." To implement this mandate, in fiscal year 1999/2000 Cal/EPA submitted a formal budget change proposal (BCP) to establish the position of Assistant Secretary for Children's Environmental Health under the career executive assignment (CEA) program. The BCP was approved in the Fall of 2000 and the position filled in January 2001. To help coordinate and accomplish the responsibilities and activities of the CEHC, Cal/EPA recruited in the Spring of 2001 an Assistant Director for the Children's Environmental Health Center under a formal training and development program on a limited-term part-time basis. These two individuals carry out the statutory requirements and activities of the CEHC.

The CEHC is tasked with coordinating "within the Environmental Protection Agency and with other state agencies, regulatory efforts, research and data collection, and other programs and services that impact the environmental health of children (HSC Sec. 900(b))." The management of CEHC came into place after many of the mandates of the Act were begun in the various boards, departments, and office within Cal/EPA. In the Summer of 2001, CEHC management developed a workplan for the first biennial report to the Governor and the Legislature on the progress made in implementing the Children's Environmental Health Act and AB 2872 (Chapter 144, Statutes of 2000). In so doing, CEHC management began the coordination and integration of many of the programs and activities within Cal/EPA presented in this report. This was accomplished through meetings and consultations with key staff within the boards, departments, and office who are responsible for meeting the requirements of both statutes.

The CEHC is to "coordinate with the appropriate federal agencies conducting regulatory efforts and research and data collection" conducted within Cal/EPA (HSC Sec. 900(b)). During calendar year 2001, management of the CEHC met with the Director of U.S. EPA's Office of Children's Health Protection and with the Children's Health Coordinator at U.S. EPA Region 9 to exchange information and ideas on each other's programs and identify potential areas of collaboration. These meetings resulted in CEHC's participation in, and Cal/EPA's co-sponsoring a conference on childhood asthma in San Diego in August 2001. The Center's management participated in the planning and development of the conference agenda and subject material. The conference was conducted by the Association of State and Territorial Health Officers and the Environmental Council of the States. The conference brought each state's principal health officer and environmental officer together to review their state's programmatic efforts to address the increasing incidence of asthma in children. California was represented by the Secretary for Environmental Protection and the Secretary for Health and Human Services. A summary of the conference can be found at <http://www.sso.org/ecos/Asthma2/WorkInProgress/Asthma.htm>. As part of the coordination efforts, Center management has given major presentations on California's children's environmental health program. Most recently, an overview of the Program was presented at the National Conference of State Legislatures' pre-conference "Children's Health & the Environment: Making Connections, Making Policy." The U.S. EPA's Office of

Children's Health Protection sponsored this conference. The CEHC management provided extensive input on the U.S. EPA's revised report on *"America's Children and the Environment: A First View of Available Measures."* This report is U.S. EPA's effort to develop environmental indicators of children's health. California is frequently acknowledged in this report for its in-depth programs and large data base of environmental contaminants that are related to children's exposures and health. The CEHC will continue its participation with U.S. EPA in the development of measures (indicators) of children's health. The CEHC management also collaborated with U.S. EPA Region 9 in selection of research proposals that would assess exposures to children from diesel school bus emissions. The CEHC worked with U.S. EPA to secure additional funding for the Air Resources Board's indoor air monitoring of children at school. Coordination with federal regulatory agencies has proven to be a successful and productive effort for the CEHC.

Perhaps the most visible activity of the CEHC will result from the requirement to "report to the Legislature and the Governor no later than December 31, 2001, on the progress of the state board (Air Resources Board) and the office (Office of Environmental Health Hazard Assessment) toward implementing the Act (Children's Environmental Health Protection Act of 1999)" (HSC 900 (d)). The report embodied in this document presents the status of each of Cal/EPA board's, department's and office's programs that addresses one or more aspects of children's environmental health. This report also identifies for the next two years a few of the key goals of each of the boards, departments and office that participate in children's environmental health programs. During calendar year 2002, the CEHC expects to develop and post a web page that allows easy access to information on not only the Center's activities, but those of the boards, departments, and office within Cal/EPA. This will provide interested parties with more timely information that will be formally submitted to the Legislature and the Governor in the next biennial report in 2003. The web page will also provide links to other sites, including those of State and Federal agencies, with key technical information and educational resources related to children's environmental health.

Finally, the CEHC is to "make recommendations for any statutory or regulatory changes that may be necessary to carry out the intent of the act to protect the public health, including infants and children, from air pollutants and toxic air contaminants (HSC 900(d))." The CEHC is currently reviewing the November 30, 2001 public review draft of *"Review of the California Ambient Air Quality Standards for Particulate Matter and Sulfates – Report to the Air Quality Advisory Committee."* Upon completion of the review, Center management will provide comments and recommendations to the ARB and the OEHHA. Upon completion of the studies of the adequacy of the existing air quality monitoring network, the CEHC will work with the Air Resources Board to develop recommendations for any regulatory or statutory changes needed to ensure that infants' and children's exposures can be adequately assessed. The CEHC suggests that the findings of Sec. II, part D, chapter 2 of this report on contamination at existing school sites demonstrates a "gap" in evaluating risks as school properties that should be addressed. While it would require a major effort and significant resources to review 8,000 existing school sites in California, consideration should be given to prioritizing those that would warrant an initial screening risk assessment, perhaps starting with older schools (30–40 years old) in urban environments.

## V. REFERENCES

### A. Senate Bill 25 (CHAPTER 731, STATUTES OF 1999)

FILED WITH SECRETARY OF STATE OCTOBER 10, 1999

APPROVED BY GOVERNOR OCTOBER 7, 1999

PASSED THE SENATE SEPTEMBER 8, 1999

PASSED THE ASSEMBLY SEPTEMBER 7, 1999

INTRODUCED BY Senator Escutia

(Principal coauthors: Assembly Members Kuehl and Villaraigosa)

(Coauthors: Senators Alarcon, Figueroa, Ortiz, Perata, Polanco, Sher, Solis, and Speier)

(Coauthors: Assembly Members Alquist, Aroner, Firebaugh, Honda, Jackson, Knox, Lempert, Mazzoni, Romero, Shelley, Steinberg, Thomson, Vincent, Washington, and Wildman)

An act to amend Sections 39606, 39660, and 40451 of, to add Section 39617.5 to, to add Part 3 (commencing with Section 900) to Division 1 of, and to add Article 4.5 (commencing with Section 39669.5) to Chapter 3.5 of Part 2 of Division 26 of, the Health and Safety Code, relating to environmental health protection.

#### LEGISLATIVE COUNSEL'S DIGEST

SB 25, Escutia. Environmental health protection: children.

(1) Existing law requires the State Air Resources Board to adopt ambient air quality standards in consideration of specified factors, including public health effects, as provided, and to specify threshold levels for health effects in listing substances determined to be toxic air contaminants. Existing law requires the Office of Environmental Health Hazard Assessment, upon request of the state board, to evaluate the health effects of and prepare recommendations regarding specified substances which may be or are emitted into the ambient air and that may be determined to be toxic air contaminants. Under existing law, the state board's request is required to be in accordance with an agreement that ensures that the office's workload in implementing these provisions will not be increased over that budgeted for the 1991-92 fiscal year, as provided.

This bill would eliminate the requirement for that agreement, and would impose specified requirements on the state board and the office generally relating to the protection of infants and children from environmental health hazards. The bill would require **the state board**, not later than December 31, 2000, to review all existing health-based ambient air quality standards to determine whether the standards adequately protect the health of the public, including infants and children, and to revise the highest priority air quality standard determined to be inadequate, not later than December 31, 2002. The bill would require **the office**, by July 1, 2001, to establish a list of up to 5 specified toxic air contaminants that may cause infants and children to be especially susceptible to illness.

The bill would require the state board to review and, as appropriate, revise any control measures adopted for those toxic air contaminants, to reduce exposure to those toxic air contaminants, as provided.

(2) Existing law requires the South Coast Air Quality Management District to notify all schools in the South Coast Air Basin whenever any federal primary ambient air quality standard is predicted to be exceeded.

This bill would also require the south coast district to notify day care centers in that basin, to the extent feasible and upon request. The bill would create a state-mandated local program by imposing new duties on the south coast district.

(3) The bill would create the Children's Environmental Health Center within the Environmental Protection Agency to, among other things, serve as chief advisor to the Secretary for Environmental Protection and to the Governor on matters within the jurisdiction of the agency relating to environmental health and environmental protection as it relates to children.

(4) This bill would incorporate additional changes to Section 40451 of the Health and Safety Code, proposed by SB 1195, to be operative only if SB 1195 and this bill are both chaptered on or before January 1, 2000, and this bill is chaptered last.

(5) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement, including the creation of a State Mandates Claims Fund to pay the costs of mandates that do not exceed \$1,000,000 statewide and other procedures for claims whose statewide costs exceed \$1,000,000.

This bill would provide that, if the Commission on State Mandates determines that the bill contains costs mandated by the state, reimbursement for those costs shall be made pursuant to these statutory provisions.

## **THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:**

### **SECTION 1. The Legislature finds and declares all of the following:**

(a) Infants and children have a higher ventilation rate than adults relative to their body weight and lung surface area, resulting in a greater dose of pollution delivered to their lungs.

(b) Children have narrower airways than adults. Thus, irritation or inflammation caused by air pollution that would produce only a slight response in an adult can result in a potentially significant obstruction of the airway in a young child.

(c) Children spend significantly more time outdoors, especially in the summer, when ozone air pollution levels are typically highest. National statistics show that children spend an average of 50 percent more time outdoors than adults.

(d) Air pollution is known to exacerbate asthma and be a trigger for asthma attacks in infants and children, 500,000 of whom are afflicted with this chronic lung disease in California.

(e) Infant's and children's developing organs and tissues are more susceptible to damage from some environmental contaminants than are adult organs and tissues.

(f) It is the intent of the Legislature in enacting this act, to require that the state's air quality standards and airborne toxic control measures be reviewed to determine if they adequately protect the health of infants and children, and that these standards and measures be revised if they are determined to be inadequate.

(g) It is also the intent of the Legislature in enacting this act to require the State Air Resources Board and the Office of Environmental Health Hazard Assessment to consider the health impacts to all populations of children, including special subpopulations of infants and children that comprise a meaningful portion of the general population, such as children with asthma, cystic fibrosis, or other respiratory conditions or diseases, in setting or revising standards pursuant to this act.



**SEC. 2. Part 3 (commencing with Section 900) is added to Division 1 of the Health and Safety Code, to read:**

**PART 3. CHILDREN'S ENVIRONMENTAL HEALTH CENTER**

900. There is hereby created the Children's Environmental Health Center within the Environmental Protection Agency. The primary purposes of the center shall include all of the following:

(a) To serve as the chief advisor to the Secretary for Environmental Protection and to the Governor on matters within the jurisdiction of the Environmental Protection Agency relating to environmental health and environmental protection as each of those matters relates to children.

(b) To assist the boards, departments, and offices within the Environmental Protection Agency to assess the effectiveness of statutes, regulations, and programs designed to protect children from environmental hazards.

(c) To coordinate within the Environmental Protection Agency and with other state agencies, regulatory efforts, research and data collection, and other programs and services that impact the environmental health of children, and coordinate with appropriate federal agencies conducting related regulatory efforts and research and data collection.

(d) In consultation with the State Air Resources Board and the Office of Environmental Health Hazard Assessment, and notwithstanding Section 7550.5 of the Government Code, to report to the Legislature and the Governor no later than December 31, 2001, on the progress of the state board and the office toward implementing the act that added this part during the 1999-2000 Regular Session and to make recommendations for any statutory or regulatory changes that may be necessary to carry out the intent of that act to protect the public health, including infants and children, from air pollutants and toxic air contaminants.

**SEC. 3. Section 39606 of the Health and Safety Code is amended to read:**  
**39606.**

(a) The state board shall do both of the following:

(1) Based upon similar meteorological and geographic conditions and consideration for political boundary lines whenever practicable, divide the state into air basins to fulfill the purposes of this division.

(2) Adopt standards of ambient air quality for each air basin in consideration of the public health, safety, and welfare, including, but not limited to, health, illness, irritation to the senses, aesthetic value, interference with visibility, and effects on the economy. These standards may vary from one air basin to another. Standards relating to health effects shall be based upon the recommendations of the Office of Environmental Health Hazard Assessment.

(b) In its recommendations for submission to the state board pursuant to paragraph (2) of subdivision (a), the Office of Environmental Health Hazard Assessment, to the extent that information is available, shall assess the following:

(1) Exposure patterns, including, but not limited to, patterns determined by relevant data supplied by the state board, among infants and children that are likely to result in disproportionately high exposure to ambient air pollutants in comparison to the general population.

(2) Special susceptibility of infants and children to ambient air pollutants in comparison to the general population.

(3) The effects on infants and children of exposure to ambient air pollutants and other substances that have a common mechanism of toxicity.

(4) The interaction of multiple air pollutants on infants and children, including the interaction between criteria air pollutants and toxic air contaminants.

(c) In assessing the factors specified in subdivision (b), the office shall use current principles, practices, and methods used by public health professionals who are experienced practitioners in the field of human health effects assessment. The scientific basis or scientific portion of the method used by the office to assess the factors set forth in subdivision (b) shall be subject to peer review as described in Section 57004 or in a manner consistent with the peer review requirements of Section 57004. Any person may submit any information for consideration by the entity conducting the peer review, which may receive oral testimony.

(d) (1) No later than December 31, 2000, the state board in consultation with the office, shall review all existing health-based ambient air quality standards to determine whether, based on public health, scientific literature, and exposure pattern data, the standards adequately protect the health of the public, including infants and children, with an adequate margin of safety. The state board shall publish a report summarizing these findings.

(2) The state board shall revise the highest priority ambient air quality standard determined to be inadequate to protect infants and children with an adequate margin of safety, based on its report, no later than December 31, 2002. Following the revision of the highest priority standard, the state board shall revise any additional standards determined to be inadequate to protect infants and children with an adequate margin of safety, at the rate of at least one per year. The standards shall be established at levels that adequately protect the health of the public, including infants and children, with an adequate margin of safety.

(e) Nothing in this section shall restrict the authority of the state board to consider additional information in establishing ambient air quality standards or to adopt an ambient air quality standard designed to protect vulnerable populations other than infants and children.

**SEC. 4. Section 39617.5 is added to the Health and Safety Code, to read:**  
**39617.5.**

(a) Not later than January 1, 2003, the state board shall do all of the following:

(1) Evaluate the adequacy of the current monitoring network for its ability to gather the data necessary to determine the exposure of infants and children to air pollutants including criteria air pollutants and toxic air contaminants.

(2) Identify areas where the exposure of infants and children to air pollutants is not adequately measured by the current monitoring network.

(3) Recommend changes to improve air pollution monitoring networks and data collection to more accurately reflect the exposure of infants and children to air pollutants.

(b) In carrying out this section, the state board, in cooperation with the districts, shall expand its existing monitoring program in six communities around the state in nonattainment areas, as selected by the state board, to include special monitoring of children's exposure to air pollutants and toxic contaminants. The expanded program shall include placing air pollution monitors near schools, day care centers, and outdoor recreational facilities that are in close proximity to, or downwind from, major industrial sources of air pollutants and toxic air contaminants, including, freeways and major traffic areas. The purpose of the air pollution monitors shall be to conduct sampling of air pollution levels affecting children. Monitoring may include the use of fixed, mobile, and other monitoring devices, as appropriate.

(c) The expanded monitoring program shall include the following:

(1) Monitoring during multiple seasons and at multiple locations within each community at schools, day care centers, recreational facilities, and other locations where children spend most of their time.

(2) A combination of upgrading existing fixed monitoring sites, establishing new fixed monitoring sites, and conducting indoor and outdoor sampling and personal exposure measurements in each community to provide the most comprehensive data possible on the levels of children's exposure to air pollutants and toxic air contaminants.

(d) Data collected from expanded air quality monitoring activities conducted pursuant to this section may be used for any purpose authorized by law, including, but not limited to, determinations as to whether an area has attained or has not attained the state and national ambient air quality standards, if the monitoring devices from which the data was collected meet the monitoring requirements specified in Section 58.14 of Title 40 of the Code of Federal Regulations for special purpose monitors, all other monitoring requirements of Part 58 of Title 40 of the Code of Federal Regulations, and all applicable requirements specified in regulations adopted by the state board.

**SEC. 5. Section 39660 of the Health and Safety Code is amended to read:  
39660.**

(a) Upon the request of the state board, the office, in consultation with and with the participation of the state board, shall evaluate the health effects of and prepare recommendations regarding substances, other than pesticides in their pesticidal use, which may be or are emitted into the ambient air of California and that may be determined to be toxic air contaminants.

(b) In conducting this evaluation, the office shall consider all available scientific data, including, but not limited to, relevant data provided by the state board, the State Department of Health Services, the Occupational Safety and Health Division of the Department of Industrial Relations, the Department of Pesticide Regulation, international and federal health agencies, private industry, academic researchers, and public health and environmental organizations. The evaluation shall be performed using current principles, practices, and methods used by public health professionals who are experienced practitioners in the fields of epidemiology, human health effects assessment, risk assessment, and toxicity.

(c) (1) The evaluation shall assess the availability and quality of data on health effects, including potency, mode of action, and other relevant biological factors, of the substance, and shall, to the extent that information is available, assess all of the following:

(A) Exposure patterns among infants and children that are likely to result in disproportionately high exposure to ambient air pollutants in comparison to the general population.

(B) Special susceptibility of infants and children to ambient air pollutants in comparison to the general population.

(C) The effects on infants and children of exposure to toxic air contaminants and other substances that have a common mechanism of toxicity.

(D) The interaction of multiple air pollutants on infants and children, including the interaction between criteria air pollutants and toxic air contaminants.

(2) The evaluation shall also contain an estimate of the levels of exposure that may cause or contribute to adverse health effects. If it can be established that a threshold of adverse health effects exists, the estimate shall include both of the following factors:

(A) The exposure level below which no adverse health effects are anticipated.

(B) An ample margin of safety that accounts for the variable effects that heterogeneous human populations exposed to the substance under evaluation may experience, the uncertainties associated with the applicability of the data to human beings, and the completeness and quality of

the information available on potential human exposure to the substance. In cases in which there is no threshold of significant adverse health effects, the office shall determine the range of risk to humans resulting from current or anticipated exposure to the substance.

(3) The scientific basis or scientific portion of the method used by the office to assess the factors set forth in this subdivision shall be reviewed in a manner consistent with this chapter by the Scientific Review Panel on Toxic Air Contaminants established pursuant to Article 5 (commencing with Section 39670). Any person may submit any information for consideration by the panel, which may receive oral testimony.

(d) The office shall submit its written evaluation and recommendations to the state board within 90 days after receiving the request of the state board pursuant to subdivision (a). The office may, however, petition the state board for an extension of the deadline, not to exceed 30 days, setting forth its statement of the reasons that prevent the office from completing its evaluation and recommendations within 90 days. Upon receipt of a request for extension of, or noncompliance with, the deadline contained in this section, the state board shall immediately transmit to the Assembly Committee on Rules and the Senate Committee on Rules, for transmittal to the appropriate standing, select, or joint committee of the Legislature, a statement of reasons for extension of the deadline, along with copies of the office's statement of reasons that prevent it from completing its evaluation and recommendations in a timely manner.

(e) (1) The state board or a district may request, and any person shall provide, information on any substance that is or may be under evaluation and that is manufactured, distributed, emitted, or used by the person of whom the request is made, in order to carry out its responsibilities pursuant to this chapter. To the extent practical, the state board or a district may collect the information in aggregate form or in any other manner designed to protect trade secrets.

(2) Any person providing information pursuant to this subdivision may, at the time of submission, identify a portion of the information submitted to the state board or a district as a trade secret and shall support the claim of a trade secret, upon the written request of the state board or district board. Subject to Section 1060 of the Evidence Code, information supplied that is a trade secret, as specified in Section 6254.7 of the Government Code, and that is so marked at the time of submission, shall not be released to any member of the public. This section does not prohibit the exchange of properly designated trade secrets between public agencies when those trade secrets are relevant and necessary to the exercise of their jurisdiction if the public agencies exchanging those trade secrets preserve the protections afforded that information by this paragraph.

(3) Any information not identified as a trade secret shall be available to the public unless exempted from disclosure by other provisions of law. The fact that information is claimed to be a trade secret is public information. Upon receipt of a request for the release of information that has been claimed to be a trade secret, the state board or district shall immediately notify the person who submitted the information, and shall determine whether or not the information claimed to be a trade secret is to be released to the public. The state board or district board, as the case may be, shall make its determination within 60 days after receiving the request for disclosure, but not before 30 days following the notification of the person who submitted the information. If the state board or district decides to make the information public, it shall provide the person who submitted the information 10 days' notice prior to public disclosure of the information.

(f) The office and the state board shall give priority to the evaluation and regulation of substances based on factors related to the risk of harm to public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the

atmosphere, and ambient concentrations in the community. In determining the importance of these factors, the office and the state board shall consider all of the following information, to the extent that it is available:

(1) Research and monitoring data collected by the state board and the districts pursuant to Sections 39607, 39617.5, 39701, and 40715, and by the United States Environmental Protection Agency pursuant to paragraph (2) of subsection (k) of Section 112 of the federal act (42 U.S.C. Sec. 7412(k)(2)).

(2) Emissions inventory data reported for substances subject to Part 6 (commencing with Section 44300) and the risk assessments prepared for those substances.

(3) Toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (42 U.S.C. Sec. 11023) and Section 6607 of the Pollution Prevention Act of 1990 (42 U.S.C. Sec. 13106).

(4) Information on estimated actual exposures to substances based on geographic and demographic data and on data derived from analytical methods that measure the dispersion and concentrations of substances in ambient air.

**SEC. 6. Article 4.5 (commencing with Section 39669.5) is added to Chapter 3.5 of Part 2 of Division 26 of the Health and Safety Code, to read:**

**Article 4.5. Special Provisions For Infants And Children**

**39669.5.** The Legislature finds and declares that certain toxic air contaminants may pose risks that cause infants and children to be especially susceptible to illness and that certain actions are necessary to ensure their safety from toxic air contaminants.

(a) By July 1, 2001, the following shall occur:

(1) The office, in consultation with the state board, shall establish a list of up to five toxic air contaminants identified or designated by the state board pursuant to Section 39657 that may cause infants and children to be especially susceptible to illness. In developing the list, the office shall take into account public exposures to toxic air contaminants, whether by themselves or interacting with other toxic air contaminants or criteria pollutants, and the factors listed in subdivision (c) of Section 39660. The office shall submit a report containing the list and its reasons for including the toxic air contaminants on the list to the Scientific Review Panel on Toxic Air Contaminants established pursuant to Article 5 (commencing with Section 39670).

(2) The scientific review panel, in a manner consistent with this chapter, shall review the list of toxic air contaminants submitted by the office pursuant to paragraph (1). As part of the review, any person may submit any information for consideration by the panel, which may receive oral testimony.

(b) (1) Within two years of the establishment of the list required pursuant to subdivision (a), the state board shall review and, as appropriate, revise any control measures adopted for the toxic air contaminants identified on the list, to reduce exposure to those toxic air contaminants pursuant to Article 4 (commencing with Section 39665), to protect public health, and particularly infants and children.

(2) Within three years of the establishment of the list required pursuant to subdivision (a), for up to five of those toxic air contaminants for which no control measures have been previously adopted, the state board shall prepare a report on the need for regulations, following the procedure specified in Section 39665. The state board shall adopt within that same three-year timeframe, as appropriate, any new control measures to reduce exposure to those toxic air contaminants pursuant to Article 4 (commencing with Section 39665), to protect public health, particularly infants and children.

(c) Beginning July 1, 2004, the office shall annually evaluate at least 15 toxic air contaminants identified or designated by the state board pursuant to Section 39657, and provide threshold exposure levels and nonthreshold health values, as appropriate, for those toxic air contaminants. The activities required pursuant to this subdivision shall continue until all toxic air contaminants are evaluated. The levels shall be established pursuant to the procedures adopted for health and risk assessments pursuant to paragraph (2) of subdivision (b) of Section 44360, and taking into account the factors listed in subdivision (c) of Section 39660. Based on this evaluation, and after review by the scientific review panel as prescribed in paragraph (2) of subdivision (a), the office shall update the list established pursuant to subdivision (a), by July 1, 2005, and each year thereafter. Within three years of the initial or subsequent listing update, for up to five of the toxic air contaminants contained on that list for which no control measures have been previously adopted, or for at least five of the toxic air contaminants if more than five toxic air contaminants have been identified, the state board shall prepare a report on the need for regulation, following the procedure specified in Section 39665. The state board shall adopt within that three-year timeframe, as appropriate, new control measures, pursuant to Article 4 (commencing with Section 39665), to reduce exposure to those toxic air contaminants, to protect public health, and particularly infants and children.

(d) Toxic air contaminants evaluated and listed pursuant to this section shall not include substances in those uses that are not subject to regulation by the state board pursuant to this chapter.

**SEC. 7. Section 40451 of the Health and Safety Code is amended to read:**

**40451.**

(a) The south coast district shall use the Pollutant Standards Index developed by the Environmental Protection Agency and shall report and forecast pollutant levels daily for dissemination in the print and electronic media.

(b) Using existing communication facilities available to it, the south coast district shall notify all schools and, to the extent feasible and upon request, daycare centers in the South Coast Air Basin whenever any federal primary ambient air quality standard is predicted to be exceeded.

(c) Whenever it becomes available, the south coast district shall disseminate to schools, amateur adult and youth athletic organizations, and all public agencies operating parks and recreational facilities in the south coast district the latest scientific information and evidence regarding the need to restrict exercise and other outdoor activities during periods when federal primary air quality standards are exceeded.

(d) Once every two months and annually, the south coast district shall report on the number of days and locations that federal and state ambient air quality standards were exceeded and the number of days and locations of these occurrences.

**SEC. 7.5. Section 40451 of the Health and Safety Code is amended to read:**

**40451.**

(a) The south coast district shall use the Pollutant Standards Index developed by the United States Environmental Protection Agency and shall report and forecast pollutant levels daily for dissemination in the print and electronic media.

Commencing July 1, 2001, the south coast district shall also include in its report and forecast levels of PM<sub>2.5</sub> in excess of the 24-hour federal ambient air standard, as adopted in July 1997, or any standard adopted by the United States Environmental Protection Agency that succeeds that standard.

(b) Using existing communication facilities available to it, the south coast district shall notify all schools and, to the extent feasible and upon request, daycare centers in the South Coast Air Basin whenever any federal primary ambient air quality standard is predicted to be exceeded. Commencing July 1, 2001, using communication facilities available to it, the south coast district shall also notify all schools in the South Coast Air Basin when the ambient level of PM<sub>2.5</sub> is predicted to exceed the 24-hour federal ambient air standard, as adopted in July 1997, or any standard adopted by the United States Environmental Protection Agency that succeeds that standard.

(c) Whenever it becomes available, the south coast district shall disseminate to schools, amateur adult and youth athletic organizations, and all public agencies operating parks and recreational facilities in the south coast district the latest scientific information and evidence regarding the need to restrict exercise and other outdoor activities during periods when federal primary air quality standards and the 24-hour federal ambient air standard for PM<sub>2.5</sub>, as adopted in July 1997, or any standards adopted by the United States Environmental Protection Agency that succeed those standards, are exceeded.

(d) Once every two months and annually, the south coast district shall report on the number of days and locations that federal and state ambient air quality standards were exceeded. Commencing July 1, 2001, the south coast district shall also include in that report the number of days and locations on and at which the 24-hour federal ambient air standard for PM<sub>2.5</sub>, as adopted in July 1997, or any standard adopted by the United States Environmental Protection Agency that succeeds that standard, is exceeded.

**SEC. 8. Section 7.5 of this bill incorporates amendments to Section 40451 of the Health and Safety Code proposed by both this bill and SB 1195.**

It shall only become operative if:

- (1) both bills are enacted and become effective on or before January 1, 2000, (2) each bill amends Section 40451 of the Health and Safety Code, and (3) this bill is enacted after SB 1195, in which case Section 7 of this bill shall not become operative.

**SEC. 9. Notwithstanding Section 17610 of the Government Code**, if the Commission on State Mandates determines that this act contains costs mandated by the state, reimbursement to local agencies and school districts for those costs shall be made pursuant to Part 7 (commencing with Section 17500) of Division 4 of Title 2 of the Government Code. If the statewide cost of the claim for reimbursement does not exceed one million dollars (\$1,000,000), reimbursement shall be made from the State Mandates Claims Fund.

## **B. Assembly Bill 2872 (CHAPTER 144, STATUTES OF 2000)**

FILED WITH SECRETARY OF STATE JULY 19, 2000

APPROVED BY GOVERNOR JULY 19, 2000

PASSED THE SENATE JULY 6, 2000

PASSED THE ASSEMBLY JULY 6, 2000

INTRODUCED BY Assembly Member Shelley

(Coauthors: Assembly Members Alquist, Aroner, Corbett, Davis, Gallegos, Hertzberg, Honda, Keeley, Knox, Kuehl, Lempert, Longville, Lowenthal, Mazzoni, Romero, Scott, Steinberg, Strom-Martin, Torlakson, Villaraigosa, Wiggins, and Wildman)

(Coauthors: Senators Alarcon, Bowen, Escutia, Murray, Ortiz, Perata, Polanco, and Solis)

An act to amend Section 7715 of the Fish and Game Code, to add and repeal Part 3 (commencing with Section 1101) of Division 1 of the Food and Agricultural Code, to amend Sections 25404, 25404.1, 25404.3, 25404.4, 25404.5, and 25404.6 of, to add Sections 901 and 39619.6 to, to add Article 8.5 (commencing with Section 25395.20) to Chapter 6.8 of Division 20 of, and to add and repeal Section 25299.50.1 of, the Health and Safety Code, and to add Sections 13177.5 and 13177.6 to the Water Code, relating to resources and environmental protection, making an appropriation therefor, and declaring the urgency thereof, to take effect immediately.

### **LEGISLATIVE COUNSEL'S DIGEST**

AB 2872, Shelley. Resources and environmental protection: biomass facility grant program: (2) cancer risk assessment guidelines: underground storage tanks: hazardous material loan program: fire safety: CUPA's: (6) health conditions in portable classrooms: fish monitoring.

(2) Existing law establishes various cancer research, screening, and treatment programs.

This bill would require the Office of Environmental Health Hazard Assessment to evaluate and update cancer risk assessment guidelines with respect to the fetus, infants, and children. It would, in accordance with a prescribed timeline, require that office to take specific actions in this regard.

The bill would also require the Children's Environmental Health Center established in the Office of the Secretary of Environmental Protection to report to the Legislature and the Governor on the implementation of these provisions.

(6) Existing law provides for the State Air Resources Board in state government and assigns the state board various duties concerning air resources.

This bill would require the state board and the State Department of Health Services, in consultation with the State Department of Education, the Department of General Services, and the Office of Environmental Health Hazard Assessment to conduct a comprehensive study and review of the environmental health conditions in portable classrooms. The report would be required to address specified issues, be completed by June 30, 2002, and be provided to appropriate policy committees of the Legislature.



**THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:****SEC. 2. Section 901 is added to the Health and Safety Code, to read:****901.**

(a) As used in this section:

(1) "Center" means the Children's Environmental Health Center established pursuant to Section 900.

(2) "Office" means the Office of Environmental Health Hazard Assessment.

(b) On or before June 30, 2001, the office shall review cancer risk assessment guidelines for use by the office and the other entities within the California Environmental Protection Agency to establish cancer potency values or numerical health guidance values that adequately address carcinogenic exposures to the fetus, infants, and children.

(c) The evaluation and update required by subdivision (b) shall include a review of existing state and federal cancer risk guidelines, as well as new information on carcinogenesis, and shall consider the extent to which those guidelines address risks from exposures occurring early in life.

(d) The evaluation and update required by subdivision (b) shall also include, but not be limited to, all of the following:

(1) The development of criteria for identifying carcinogens likely to have a greater impact if exposures occur early in life.

(2) The assessment of methodologies used in existing guidelines to address early-in-life exposures.

(3) The construction of a database of animal studies to evaluate increases in risks from short-term early-in-life exposures.

(e) On or before June 30, 2004, the office shall finalize and publish children's cancer guidelines that shall be protective of children's health. These guidelines shall be revised and updated as needed by the office.

(f) (1) On or before December 31, 2002, the office shall publish a guidance document, for use by the Department of Toxic Substances Control and other state and local environmental and public health agencies, to assess exposures and health risks at existing and proposed school sites. The guidance document shall include, but not be limited to, all of the following:

(A) Appropriate child-specific routes of exposure unique to the school environment, in addition to those in existing exposure assessment models.

(B) Appropriate available child-specific numerical health effects guidance values, and plans for the development of additional child-specific numerical health effects guidance values.

(C) The identification of uncertainties in the risk assessment guidance, and those actions that should be taken to address those uncertainties.

(2) The office shall consult with the Department of Toxic Substances Control and the State Department of Education in the preparation of the guidance document required by paragraph (1) in order to ensure that it provides the information necessary for these two agencies to meet the requirements of Sections 17210.1 and 17213.1 of the Education Code.

(g) On or before January 1, 2002, the office, in consultation with the appropriate entities within the California Environmental Protection Agency, shall identify those chemical contaminants commonly found at school sites and determined by the office to be of greatest concern based on criteria that identify child-specific exposures and child-specific physiological sensitivities. On or before December 31, 2002, and annually thereafter, the office shall publish and make available to the public and to other state and local environmental and public health agencies and school districts, numerical health

guidance values for five of those chemical contaminants identified pursuant to this subdivision until the contaminants identified have been exhausted.

(h) On and after January 1, 2002, and biannually thereafter, the center shall report to the Legislature and the Governor on the implementation of this section as part of the report required by subdivision (d) of Section 900. The report shall include, but not be limited to, information on revisions or modifications made by the office and other entities within the California Environmental Protection Agency to cancer potency values and other numerical health guidance values in order to be protective of children's health. The report shall also describe the use of the revised health guidance values in the programs and activities of the office and the other boards and departments within the California Environmental Protection Agency.

(i) Nothing in this section shall relieve any entity within the California Environmental Protection Agency of complying with Chapter 3.5 (commencing with Section 11340) of Part 2 of Division 3 Title 2 of the Government Code, to the extent that chapter is applicable to the entity on or before the effective date of this section, as added during the 2000 portion of the 1999-2000 Regular Session, or Section 57004 of the Health and Safety Code.

**SEC. 11. Section 39619.6 is added to the Health and Safety Code, to read:**

**39619.6.** By June 30, 2002, the state board and the StateDepartment of Health Services, in consultation with the StateDepartment of Education, the Department of General Services, and theOffice of Environmental Health Hazard Assessment, shall conduct a comprehensive study and review of the environmental health conditions in portable classrooms, as defined in subdivision (k) of Section17070.15 of the Education Code.

(b) The state board and the department shall jointly coordinatethe study, oversee data analysis and quality assurance, coordinatestakeholder participation, and prepare recommendations. The stateboard shall develop and oversee the contract for field work, air monitoring and data analysis, and obtain equipment for the study. The department shall oversee the assessment of ventilation systems and practices and the evaluation of microbiological contaminants, and may provide laboratory analyses as needed.

(c) By August 31,2000, the state board shall release a request for proposals for the field portion of the study. Field work shall begin not later than July, 2001. The final report shall be completed on or before June 30, 2002, and shall be provided to the appropriate policy committees of the Legislature. The study of portable classrooms shall include all of the following”:

- (1) Review of design and construction specifications, incldng those for ventilation systems.
- (2) Review of school maintenance practices, including the actual operation or nonoperation of ventilation systems.
- (3) Assessment of indoor air quality.
- (4) Assessment of potential toxic contamination, including molds and other biological contaminants.

(d) The final report shall summarize the results of the study and review, and shall include recommendations to remedy and prevent unhealthful conditions found in portable classrooms, including the need for all of the following:

- (1) Modified design and construction standards, including ventilation specifications.
- (2) Emission limits for building materials and classroom furnishings.
- (3) Other mitigation actions to ensure the protection of children's health.